1214

F/A-18 Hornet

Color Series

Lou Drendel

In Action® No. 214

Squadron Signal® Publications

F/A-18 Hornet

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Color Series

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"In Action" books, despite the title of the genre, are books that trace the development of a single type of aircraft, armored vehicle, or ship from prototype to the final production variant. Experimental or "one-off" variants can also be included. Our first "In Action" book was printed in 1971.

Acknowledgements

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Front Cover-An F/A-18C, belonging to the "Fighting Omars" of Fighter Squadron Composite Twelve (VFC-12), maneuvers with a fleet Hornet. The Fighting Omars are the Naval Reserve's premier adversary squadron that provides threat tactics training to all Navy Fighter and Strike Fighter squadrons.

Back Cover-(Top) An F/A-18C of Navy Strike Fighter Squadron (VFA) 25 "Fist Of The Fleet" recovers aboard the Nimitz-class airwing carrier USS Abraham Lincoln (CVN-72) after an April 2003 combat mission over Iraq. (Bottom) An F/A-18C of VFA-97 "Warhawks" in flight.

Preceding Page-An F/A-18C of VFA-83 "Rampagers" approaches USS John F. Kennedy (CVN-67) in rough seas.

11 December 2007. An F/A-18C Hornet (background), assigned to VFA-37 "The Raging Bulls," and an F/A-18F Super Hornet (foreground), assigned to VFA-32 "The Swordsmen," prepare to launch off the flight deck aboard the nuclear-powered aircraft carrier, USS Harry S Truman (CVN-75). In support of Operation Iraqi Freedom (OIF), Carrier Airwing (CVW) 3 and Carrier Strike Group (CCSG) 10 launched their first series of operational missions over Iraq. These two planes represent the two generations of Hornets that make up the fleet defense and strike capabilities of the Navy. (U.S. Navy photo by Mass Communication Specialist 3rd Class Ricardo J. Reyes)

McDonnell Douglas (MDD) rolled out the first F/A-18A on 13 September 1978. The striking blue-on-white color scheme had "Navy" on the left and "Marines" on the right fuselage. The Hornet's first flight occured 18 November 1978. The Navy pioneered the "principal site concept" with the F/A-18 where almost all testing was conducted at the Naval Air Test Center (NATC) Patuxent River, Maryland. Navy Test pilots conducted most of the test work. (MDD)

Introduction

The F/A-18 Hornet has become the most ubiquitous aircraft on the decks of U.S. aircraft carriers in the history of naval aviation. Granted, all Hornets are not created equal. The Super Hornet is a distant relative of the A through D Hornet. However, they are related, and all Hornets trace their roots to the Northrop YF-17, the loser of the lightweight fighter (LWF) competition held in the early 1970s. The YF-17 was developed from the Northrop P-530 Cobra, which owed its lineage to the Northrop F-5 Freedom Fighter.

The F-5 is perhaps the initial example of the LWF, designed by Northrop to be inexpensive and easy to maintain. The F-5A was strictly a day-VFR fighter that lacked any radar or other sophisticated avionics. The F-5A was followed by the F-5E "Tiger II," which was more complex but still a "Lightweight." F-5s have been operated by 36 air forces worldwide.

The designer behind the F-5 was Lee Begin, and he followed this success with another export proposal. The P-530 Cobra was a lightweight design that featured leading edge root extensions (LERX) and twin vertical tails. Like the F-5, the P-530 Cobra was a twin-engine design. A full-scale mockup was displayed at the Paris Air Show in 1971, but the LWF competition, announced by the U.S. Air Force (USAF) in 1972, accelerated the development of what would become the YF-17A.

The USAF announced two winners of the preliminary competition and ordered two examples each from Northrop and General Dynamics. The first YF-17 rolled out on 4 April 1974 and made its first flight on 9 June 1974. The test flight evaluations of the YF-16 and YF-17 began in late 1974. The LWF competition was no longer just a competition to see who could build the best LWF. The USAF had established an Air Combat Fighter (ACF) requirement in April 1974, and the winner of the LWF competition would be selected to fill this requirement, which meant a big sale to the USAF.

The USAF had been forced into accepting the ACF by the "Fighter Mafia" within the Pentagon. Headed by maverick air combat genius Major John Boyd and civilian Pierre Spey,

The Northrop YF-17, which was the losing entry in the LWF competition in the 1970s, provided the design platform for what would become the F/A-18 Hornet. (Northrop)

this ad-hoc group made a politically and tactically powerful argument in favor of an agile and (relatively) cheap ACF. It was to be a better MiG-21. The USAF really wanted the F-15 Eagle which was anything but cheap, though it certainly was the most capable air-to-air fighter ever built.

The F-16 was announced as the winner of the LWF competition on 13 January 1975. This win was mostly due to the fact that the F-16's single engine was the same as the engines used in the F-15. Ironically, the F-16 was put into service as an air-to-ground fighter, with the air-to-air mission a very distant secondary requirement.

If the USAF had the big expensive F-15 as its primary air-to-air fighter, the Navy also had a big, expensive interceptor in the F-14. Additionally, the Navy had a requirement for a LWF to replace the A-7 and F-4 in the air-to-ground role. The U.S. Congress dictated that the Navy chose one of the LWF contenders as its new fighter/attack aircraft. Neither General Dynamics nor Northrop had the requisite experience in design of shipboard aircraft; so they picked the respective partners of Ling Timco Vought (LTV) and McDonnell Douglas (MDD). The twin-engine YF-17 had a definite advantage in this competition, and on 2 May 1975, the Navy announced the MDD/Northrop design as the winner. It would be built as the F-18.

The number six pre-production Hornet refuels from a KA-3B tanker during testing at NATC Patuxent River. The KA-3B was the primary fleet tanker during the 1960s and 1970s. Fleet tanking was supplemented by "Buddy Pack" refueling tanks carried by a variety of fleet attack aircraft. The modern U.S. Navy has no designated tankers. All Hornets are configurable to tankers. (MDD).

F/A-18A Hornet

The U.S. Navy announced its choice for Naval Air Combat Fighter (NACF) as the MDD/Northrop design on 2 May 1975. Although visually similar, the F-l 8 Hornet, as the new design was christened, was not a modified version of the YF-17. The F-18 Hornet was similar in size and shape, but the task of building to naval specifications and multi-tasking what had been designed as a land-based, single-purpose technology demonstrator required a new design. Congress dictated that the winning LWF design be developed as a multi-service airplane. General Dynamics collaborated with LTV to develop a carrier-based version of the F-l 6, and they expected the Navy would buy it. The wording of the Congressional mandate left room for argument that the Navy might choose from either of the LWF designs, and after examination of both designs, MDD determined that the YF-17 was a better design for the NACF submission. After heated political in-fighting, the MDD/Northrop partnership won their argument.

Initial thoughts centered on the Hornet being built in two versions—the F-18, optimized for air-to-air combat and the A-18, optimized for the attack mission. However, the Hornet quickly proved it had the capability to perform both tasks. Thus, it was renamed the F/A-18 (Proof of this capability was demonstrated in Operation Desert Storm when a pair of F/A-18Cs, assigned to VFA-81 "Sunliners," each loaded with four Mk 84s (2,000 pound bombs), two AIM-9 Sidewinders, and two AIM-7 Sparrows; engaged and shot down a pair of Mikoyan-Gurevich (MiG)-21s while on route to targets in Iraq. In the Vietnam War, the appearance of MiGs often forced fighters to jettison their bombs before engaging the enemy.

The F/A-18A differed from the YF-17 in a number of ways. One of the most basic changes made was the overall strengthening of the airframe to withstand the rigors of carrier operations. Radical redesign of the landing gear was necessary and was perhaps the most noticeable of the many changes made in the basic YF-17 design. Other changes made included lengthening and widening the fuselage to increase internal fuel capacity from 5,500 pounds to 10,800 pounds, increasing wing area from 350 to 400 square feet, reducing span and changing shape to the horizontal stabilators to accommodate carrier storage, and enlarging the nose cone to accommodate a multimode radar. The required approach speeds for carrier landings resulted in modifications to the wing and leading edge extension (LEX) surfaces of the YF-17 design to provide additional lift. The YF-17 LEX was extended farther forward on the fuselage, and the plan view of the LEX was modified to produce the additional lift while retaining high-angle-of-attack characteristics that were a hallmark of the YF-17. The deflections of the wing leading- and trailing-edge

flaps were increased, and the ailerons were programmed to droop in low-speed flight to augment lift. Finally, a sawtooth discontinuity was added to the leading edges of both the wing and the stabilators to provide increased lift.

The engine proposed for the F/A-18 was the experimental GEYJ-101 afterburning turbofans, which the Navy renamed the F-404. General Electric was particularly anxious to make this engine successful since Pratt & Whitney was already making engines for the F-14, F-15, and F-16. The F-404 engines installed in the Hornet had close to the same thrust as the General Electric J-79 engines, which powered the F-4. Thrust commonality was where the similarity ended between the two engines.

The F-404 was half the weight, was one-third shorter, had 40 percent fewer parts, was four times more reliable, could be installed on either side of the Hornet, was smokeless, and had the same responsiveness as the J-79 although through a greater range of operation. The Hornet demonstrated better than a 90 degree angle of attack (AOA) with a 45 degree angle of side slip. The J-79 was one of the great fighter engines of the jet age, but the newer F-404 showed how much the state of the art had advanced. The performance of the engines provided a significant improvement over the F-4 and A-7, which the F/A-18 would replace.

The F/A-18 also incorporated self-start capability with a turbine-driven auxiliary power unit (APU), which drove the air turbine starter on the airframe mounted accessory drive (AMAD) and cranked the engine through a power take-off shaft. On-board fire extinguishers allowed the pilot to put out fires quickly. The fuel system had two self-sealing, independent feed tanks and self-sealing fuel lines which were contained within the tanks. The wing tanks had foam, and all fuselage voids had foam. No fuel tanks were located between or around the engines, and no electrical power was needed to transfer or feed fuel to the engines. Hydraulic fluid for the F/A-18 was non-flammable, and it circulated through two completely separated systems, each of which had two independent branches. The system provided for automatic shut-down of any failed branch. The structure of the F/A-18 incorporated multiple-spar wings and vertical tails and all control surfaces were redundant (this fact was demonstrated dramatically when a TF-18A from the United States Naval Test Pilot School (USNTPS) flew through trees at the departure end of the runway at the Naval Air Station (NAS) Patuxent River. This stunt removed the leading edge flaps, major portions of the trailing edge flaps, and the entire port stabilator. The flight control computer compensated for the missing control surfaces, which allowed the pilot to make one circuit and land safely).

Fifty percent of the structural weight of the Hornet was aluminum; 16 percent was steel; 13 percent was titanium (including the firewall between the engines); and only 9 percent of the weight was advanced graphite/epoxy even though it covered 40 percent of the surface area. Use of graphite/epoxy in some of the most fatigue-prone areas such as the speed brake, wing skins, trailing edge flaps, stabilators, vertical fins, and rudders contributed to the high design service life of 6,000 hours. Maintainability was an important aspect of combat aircraft design since the successful mission performance required quick turn-around and high in-service rates. The F/A-18 raised those standards

3 November 1979. **The number three Hornet arrives overhead USS America (CV-66) for its first sea trials. The third Hornet made 32 successful launches and landings. (MDD)**

to new levels. This raise in standards doubled the mean flight hours between failure compared to the F-4 and A-7 and reduced the maintenance man hours per flight hour to one-third that of the F-4 and half that of the A-7. The Hornet was designed with 307 access doors, 90 percent of which could be reached without the benefit of work stands. A single point maintenance monitor panel (MMP) in the nose wheel well gave a more

Lt. John O'Donnell flies "Roman 86/2" on an April 1987 practice bombing mission to the Rodman Range in central Florida. VFA-106 was the East Coast Hornet replacement training squadron and was based at NAS Cecil Field outside of Jacksonville, Florida. (Author's collection)

detailed indication of the failure identifying the specific assembly that failed. The MMP also told the ground crew if servicing of engine oil, hydraulics, liquid oxygen (LOX), radar coolant, or fire extinguishing agents were necessary. The maintenance signal data recorder kept track of all maintenance, which simplified keeping maintenance records. Other built-in test (BIT) functions could be accessed by the pilot, who would use one of three cathode ray tubes (CRTs) in the cockpit before and after each flight.

Aerodynamics and advanced engine technology gave the Hornet new capabilities. But the heart of the F/A-18 was the cockpit. The capability to carry a variety of weapons would lose its impact if the pilot was not able to use them effectively. Digital technology made it possible to provide the Hornet pilot with more information than was available in both cockpits of the F-4 combined with the single cockpit of the A-7. Like other fighters of its generation, the primary information display was the Head-Up-Display (HUD) on the gunsight glass. The HUD displayed airspeed, altitude, vertical speed, AOA, heading, Mach number, Gs, and a variety of weapons delivery information. The older, round barometric instruments, which were located in a bottom corner of the panel, were relegated to a backup role.

Aircraft systems were monitored with the information displayed on CRTs and managed with the 20 push buttons that surrounded each of these CRTs. The benefits of having all the necessary information within the pilot's immediate field of view were reduced fatigue and a reduced susceptibility to vertigo. The preceding generations of fighter aircraft had dozens of controls and gages on the cockpit consoles, which often required a pilot to look down, left, right, or even slightly to the rear in order to use them. This constant movement was a sure-fire recipe for vertigo when outside visual cues were not sharply defined.

All combat functions for air-to-air and air-to-ground attack could be operated from controls on the throttles and stick grip (Hands-On-Throttle-And-Stick or HOTAS has since become another standard of modern fighter design). The pilot's ability to operate these controls without looking into the cockpit was the most critical combat skill. Fighter pilots nicknamed this skill "playing the piccolo," and it required frequent practice to maintain a combat edge. The heart of the F/A-18A weapons system was the Hughes AN/APG-65 multimode pulse Doppler radar. The radar was operated in several modes that including: Boresight, Vertical Acquisition, and HUD during air combat maneuvering (ACM). These modes featured automatic acquisition of maneuvering targets at ranges of 500 feet to five nautical miles.

Another ACM mode was the Gun Director Mode, which was a special short-range track mode. The radar's high pulse repetition frequency (PRF) made it very effective in long range tracking of nose aspect targets, which gave velocity and azimuth information. Range-While-Search used high and medium PRF to detect all-aspect targets, and Track-While-Scan maintained 10 target track files while displaying eight. When the Advanced Medium Range Air to Air Missile (AMRAAM) missile became operational, the F/A-18 was able to simultaneously attack as many targets as it had missiles to shoot. The Raid Assessment feature of the radar allowed the pilot to expand the region centered on a single

tracked target. In turn resolution in the target vicinity increased, which permitted radar separation of closely spaced targets.

In the air-to-ground attack role, the APG-65 had a number of modes that included long range surface mapping, which enhanced target location and identification; navigation, and weapons delivery. High resolution mapping combined with additional modes of the radar gave the pilot the ability to detect and track fixed, moving, and sea surface targets and the ability to cue other sensors such as the Forward Looking Infrared (FLIR). A terrain avoidance mode was available for low-level night or bad weather penetration missions. A precision velocity update feature improved navigation accuracy by automatically updating the inertial navigation platform. This feature also served as the Doppler input to weapons delivery computation. A sea surface search mode suppressed sea clutter by sampling the sea state and setting a threshold above that of sea clutter. Two-channel, mono-pulse angle tracking and coherent frequency agility allowed accurate tracking of ground fixed or moving targets, and air-to-surface ranging was provided by the radar through use of split-gate range tracking at large depression angles or elevation mono-pulse tracking at small depression angles. Target destination provided automatic acquisition in this mode, and designation also could be provided by the laser spot tracker or by FLIR. These capabilities were provided by a fully software programmable signal processor, which performed 7.2 million operations per second. The APG-65 was extremely reliable. It qualified for the 106 hours mean time between failure (MTBF) standards set by military test procedures. Shop replaceable assemblies, no scheduled maintenance requirements, and the fact that no special maintenance tools were needed, made maintenance faster and easier for military technicians, which translated to a higher in-service rate for operational Hornet squadrons.

Although it was capable of carrying up to 17,000 pounds of ordnance, the F/A-18A was designed with only one internal weapon, a six-barrel 20 millimeter (mm) Vulcan cannon. This weapon was finally included in the Hornet after a lengthy battle between the combat aviators who suffered through the Vietnam War in F-4s without an internal gun and the engineers who were concerned about the 5,000 pounds of weight the gun, ammunition, and gas required to carry it added to the basic airplane. The aviators finally prevailed in having the gun added and in having it placed where it would be most accurate and reliable—on the centerline of the airplane, in the nose, right next to the radar. In having the gun added, the aviators created some tough problems for the designers. The 20MM Vulcan was capable of firing up to 6,000 rounds per minute. This rate of fire caused vibration and generated a lot of heat, gas, and smoke, all of which was harmful to the reliable operation of sophisticated radar. The radar compartment could be sealed to keep out gas and smoke, and the cooling could be augmented. However, dealing with the vibration was tougher. This task required identifying the gun vibration frequencies and building baffles to dampen out their effects on the radar.

The F/A-18A made its first flight on 18 November 1978 with MDD chief test pilot Jack Krings at the controls. This flight was made from the McDonnell Aircraft facility at Lambert Field in St. Louis, Missouri. The number one Hornet (BuNo 160775) was the first of nine single-seat full scale development aircraft along with two, two-seat TF-18s that took part in the

(Above) An MDD technician checks the status of one of the "black boxes" in this F/A-18A. BITs are designed to ensure the flight control computers, hyrdaulic servos, and hydraulic switching valves are functioning properly prior to and during the flight. (MDD)

(Below) Navy Attack Squadron (VA)-25 began transition from the A-7E Corsair II to the F/A-18A Hornet in May 1983. The squadron was redesignated VFA-25 on 1 July 1983. The squadron received its total complement of 12 F/A-18As by March 1984. Operational air wing training in multiple air-to-air and air-to-ground exercises with CVW-14 and USS Constellation (CV-64) were conducted throughout 1984 and through January 1985. (U.S. Navy)

(Top) A VFA-113 Hornet flies enroute to the bombing range. VA-113 was redesignated VFA-113 "Stingers" when they traded their A-7s for F/A-18A Hornets on 25 March 1983. The Stingers completed the transition to the multi-role Hornet and became the first operational fleet, combat-ready VFA on 14 December 1983. The squadron embarked for the first carrier deployment of the multi-mission F/A-18 with CVW-14 on board CV-64 from February to August 1985. (MDD)

(Bottom Left) In 1986, USMC Fighter/Attack Squadron (VMFA)-122 "Crusaders" became the second operational USMC F/A-18 squadron on the East Coast. VMFA-122 conducted multiple training deployments to Europe and throughout the United States, which included participation in the Unit Deployment Program (UDP). In the UDP, VMFA-122 completed 10 deployments to the Western Pacific. In October 2001, the Crusaders transitioned to the F/A-18C. (David F. Brown)

(Bottom Right) VMFA-115 began the transition from Phantoms to the F/A-18A hornet on 1 January 1985. They officially stood up with 14 aircraft on 16 August 1985. The squadron became the "Silver Eagles" in 1986. VMFA-115 conducted flight operations for six weeks from five bases in four countries and accumulated 1,182 flight hours in their first deployment. (David F. Brown)

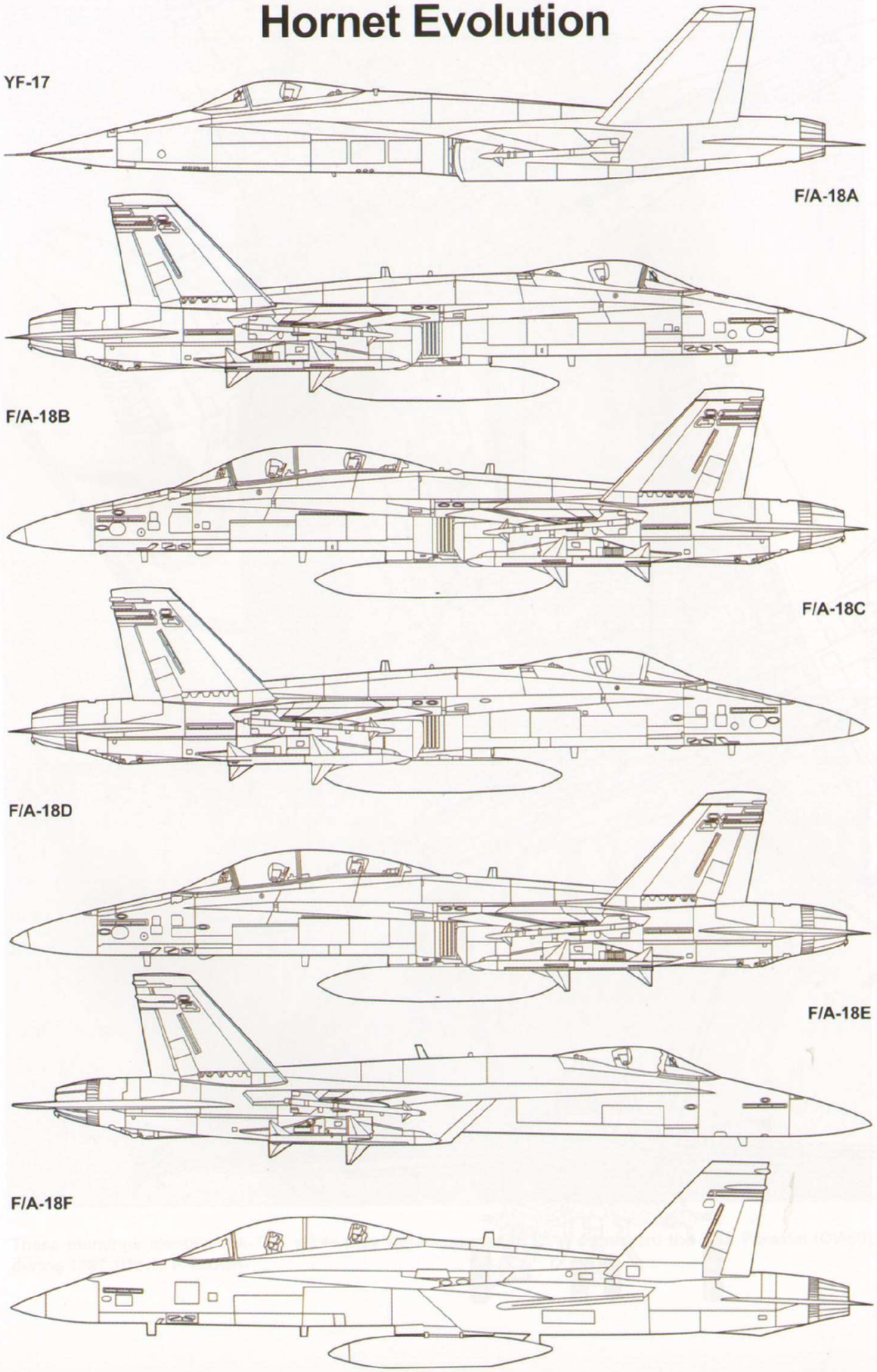
test program at the NATC in NAS Patuxent River, Maryland. The test program, which lasted nearly four years, was one of the most extensive and trouble-plagued programs ever endured by the Navy. Much of the trouble was caused by the double-digit inflation of the late 1970s, which caused inevitable cost over-runs and periodic Congressional outcries for cancellation of the entire F/A-18 program. Ultimately, the Hornet design overcame all the negatives, and the first operational Hornet squadron, VFA-125, was commissioned at NAS Lemoore, California on 13 November 1980 as the fleet readiness squadron or RAG. The VFA-125 received its first production Hornet on 19 February 1981. The first operational Hornet squadron was VMFA-314, based at the Marine Corps Air Station (MCAS) in El Toro, California. The official conversion from F-4 Phantoms to F/A-18 Hornets took place on 7 January 1983. A total of 380 F/A-18As were built. This number included the nine RDT&E airplanes used in the test program. The 380th and final F/A-18A for the U.S. Navy and USMC was accepted by VMFA-312 on 22 January 1988. The USMC continued to operate the F/A-18A, which was upgraded to the APG-73 radar and continues to receive additional avionics and weapons systems upgrades. It is now designated F/A-18A+.

In March 2007, Lt. Gen. John G. Castellaw, Deputy Commandant for Aviation, United States Marine Corps (USMC), testified before congress and noted the following plans for their Hornet fleet, "The FY 2008 Budget request contains $73.6M for the continuation of the systems upgrade programs for legacy F/A-18 platforms. Included in this request is the continued procurement of recently fielded systems such as Joint Helmet Mounted Cueing System (JHMCS), Multi-Function Information Distribution System, and Digital Communications System. The USMC continues to upgrade 56 Lot 7-9 F/A-18A to Lot 17 F/A-18C aircraft capability with digital communications and tactical data link. The USMC is upgrading the current capabilities of the F/A-18C/D with digital communications, tactical data link and tactical reconnaissance systems. This upgrade ensures that our F/A-18s remain viable and relevant in support of Department of the Navy (DoN) Tactical Air Integration and supports our Expeditionary Maneuver Warfare concept. We are also employing the LITENING targeting pod on the F/A-18A+/C/D aircraft in OIF. When combined with data link hardware and the Rover Ground Station, the LITENING pod provides real-time video to ground forces engaged with the enemy, adding a new dimension to precision fires and Intelligence, Surveillance, and Reconnaissance (ISR). Our fleet of legacy F/A-18D's is currently flying at four times their programmed rate. The FY 2008 Budget also requests $112M allowing for procurement of Center Barrel Replacements to extend the service life of F/A-18A+/C/Ds seven years to meet fleet inventory requirements until 2022. This initiative is critical to ensure we have adequate numbers of F/A-18's to meet National Military Strategy requirements until we transition to the F-35B."

(Top Left) VA-15 "Valions" began transitioning to the F/A-18A Hornet in June 1986. In October 1986, VA-15 was redesignated VFA-15. The Valions accepted their first F/A-18 Hornet in January 1987. (U.S. Navy)

(Bottom Left) In September 1987, VMFA-451 transitioned to the F/A-18 Hornet after 21 years in the F-4 Phantom. In May 1989, the squadron sailed with CVW-13 aboard the USS Coral Sea (CVA-43) for a Med Cruise after an eight-year hiatus of Beaufort-based Marine Units on carriers. During the cruise, VMFA-451 learned it was the recipient of the 1988 Hanson award as the outstanding Marine fighter-attack squadron. They ammassed 40,000 accident-free hours. The squadron returned to MCAS Beaufort in September 1989. (David F. Brown)

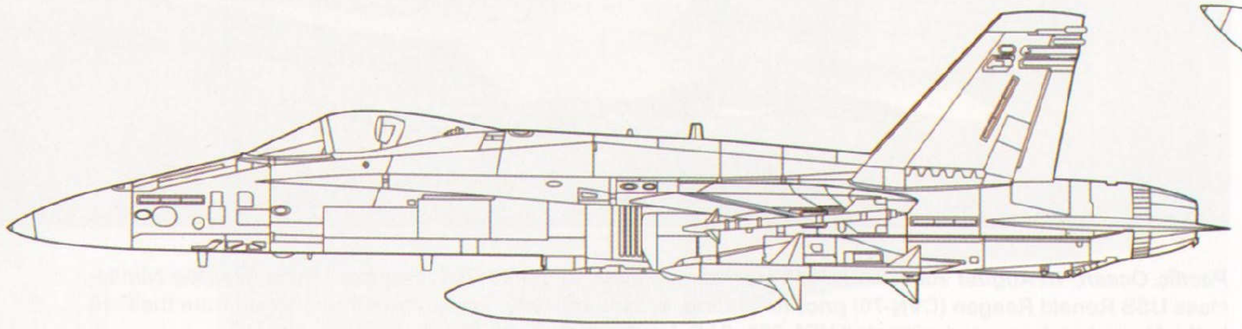
Hornet Evolution

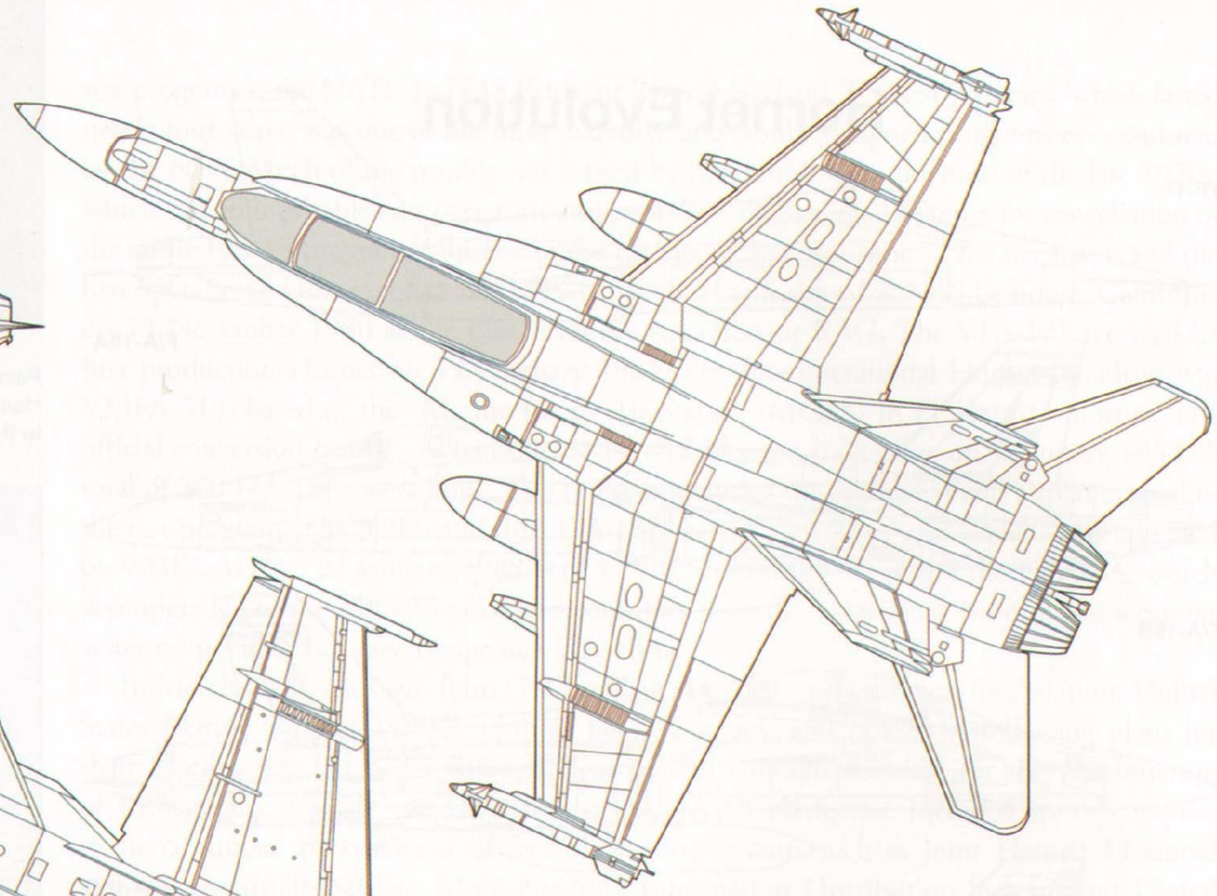


Pacific Ocean, 10 August 2005. An F/A-18 Hornet, assigned to the VF-201 "Hunters", flies near the Nimitz-class USS Ronald Reagan (CVN-76) prior to landing. In January 1999, the Hunters transitioned from the F-14 to the Hornet and were redesignated VFA-201. (U.S. Navy by Lt. Cmdr. Bob Bennet)

VA-147 "Argonauts" retired the A-7E following a Western Pacific, Indian Ocean deployment in February 1989, and VA-147 was officially redesignated as VFA-147 on 20 July 1989. (David F. Brown)

VA-203 was established on 18 July 1970. VA-203 served as an operational component of Carrier Air Wing Reserve 20 (CVWR-20). After flying the A-4L, A-7A, B, and E Corsair II, the squadron saw the arrival of the first F/A-18A Hornets in November 1989. The squadron was redesignated VFA-203 on 1 October 1989. VFA-203 is based at NAS Atlanta and performs the adversary role. (David F. Brown)





F/A-18C Specifications

Wingspan..... 37 feet, 6 inches (11.43 m) (w/o launchers)
Length.....56 feet (17.06 m)
Height.....15 feet, 3.5 inches (4.66 m)
Weight(Empty).....23,000 lbs (10,433 kg)
Weight(Combat)...Up to 51,900 lbs (23,541 kg)

Powerplant.....Two x GE F404-GE-400 turbofan engines with approximately 16,000 lbs thrust each (later F404-GE-402 engines produce 17,600 lbs thrust)

Armament.....One x 20mm M-61 rotary cannon with 570 rounds

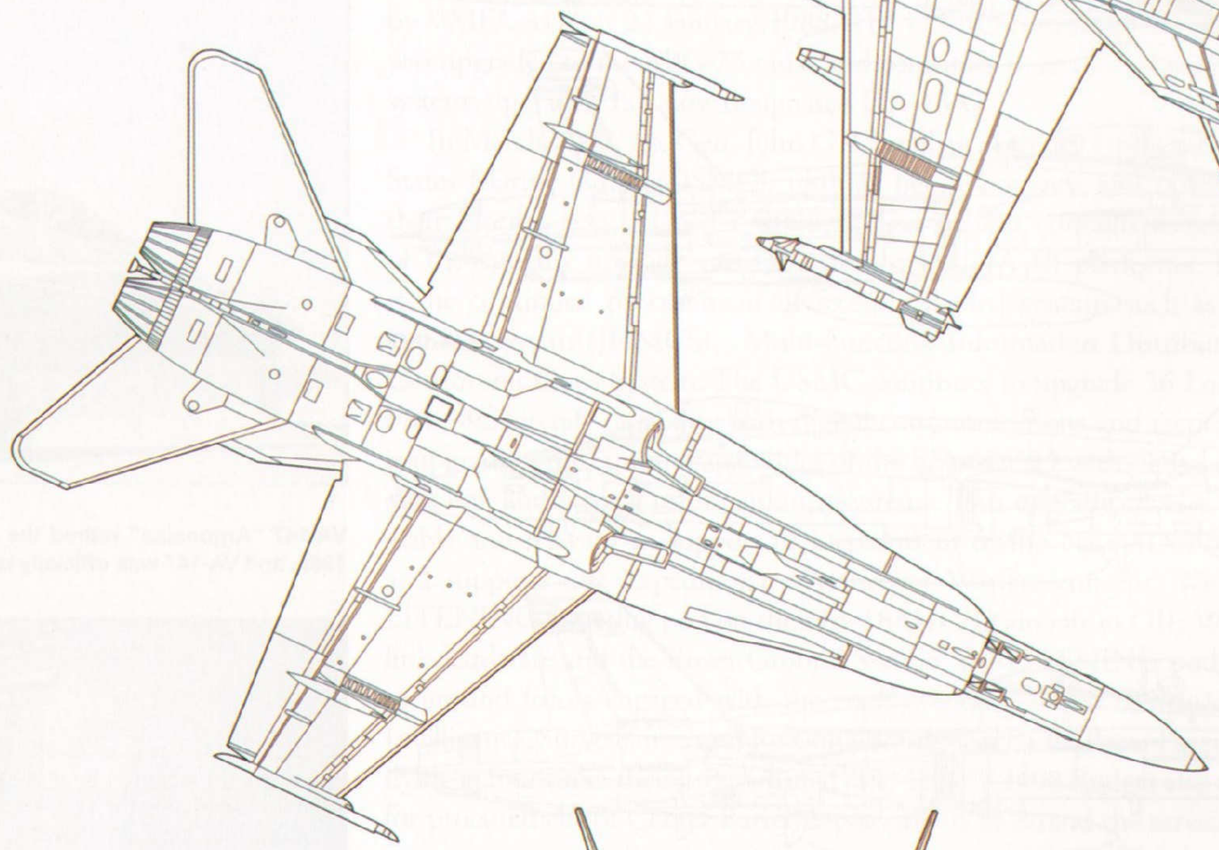
External Stores....Unguided bombs/rockets, precision guided bombs, air-to-air and air-to-surface missiles

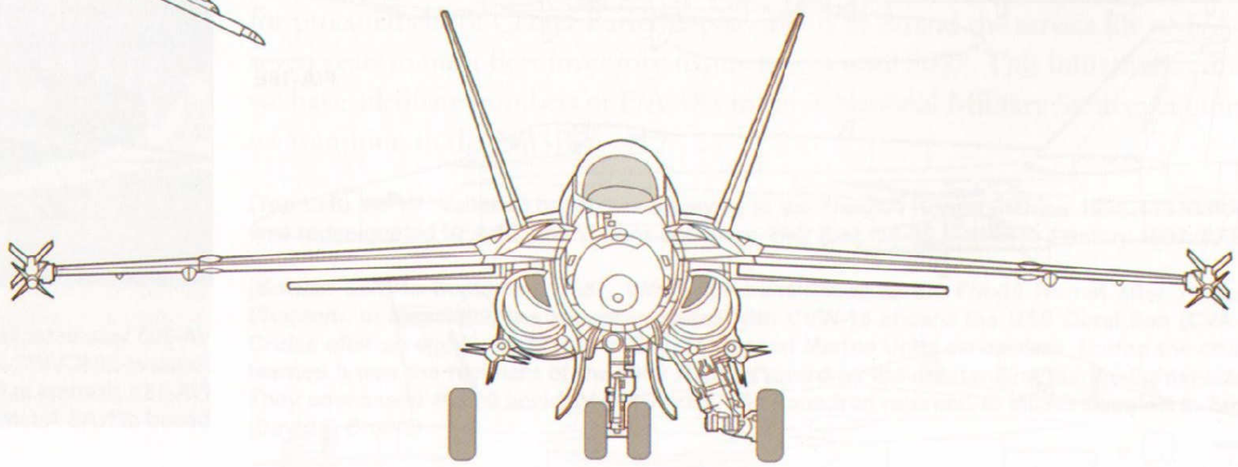
Max Speed.....1,122 mph (1,805 kmh)

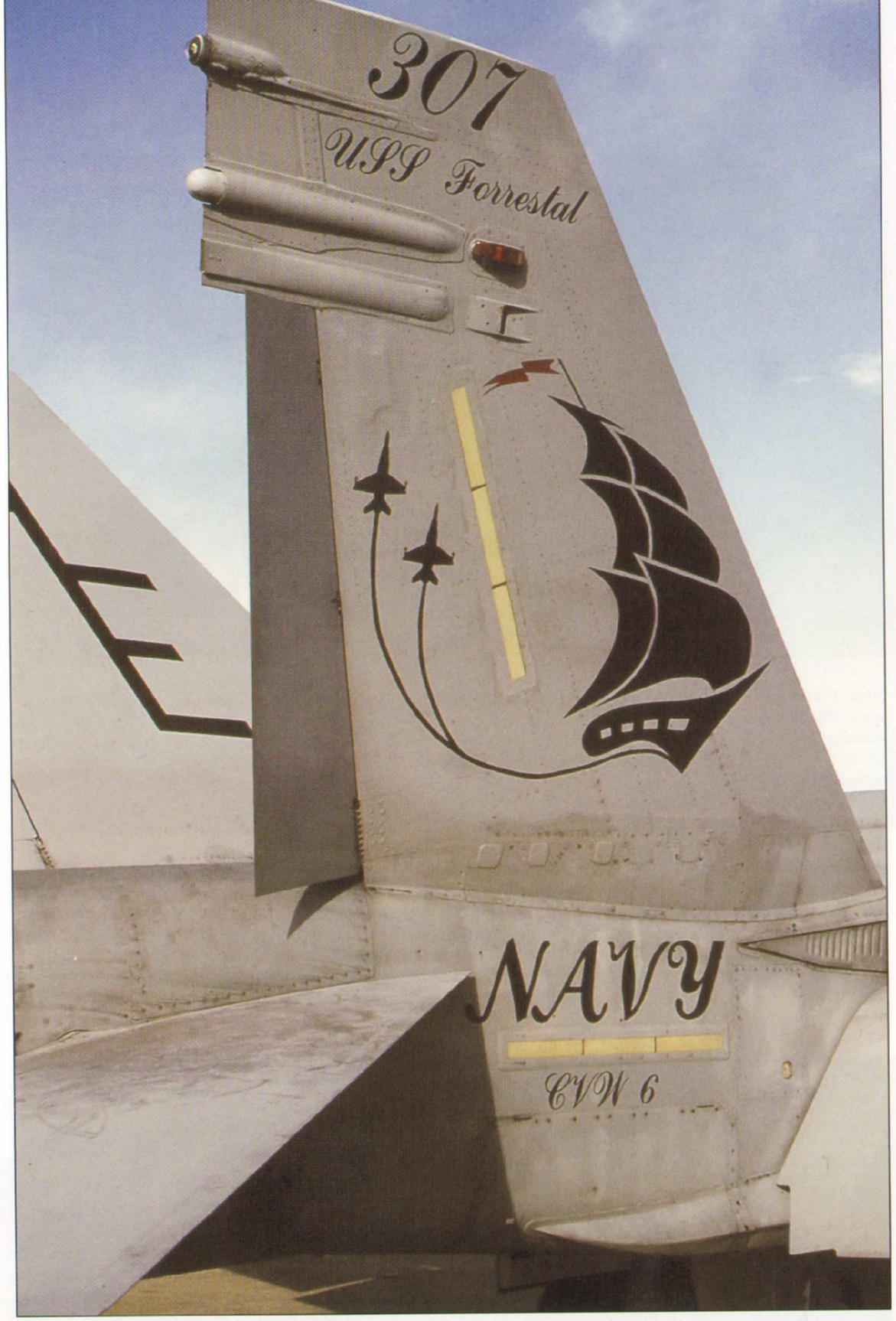
Ceiling.....50,000 feet (15,240 m)

Range (Unrefueled with three external tanks):
Approximately 2,000 miles (3,219 km)

Crew.....One







These markings identify VFA-132 while they were assigned to CVW-6 onboard the USS Forestal (CV-59) during 1987. (David F. Brown)

(Top) On 14 September 1982, VMFA-323 "Death Rattlers" turned in their last F-4 Phantom and officially began the transition to the F/A-18A Hornet. In October 1985, VMFA-323 deployed again aboard CV-43 to the Mediterranean Sea. On 15 April 1986, the Death Rattlers provided Surface to Air Missile (SAM) suppression and fighter Combat Air Patrol (CAP) sorties during the strikes on Libyan targets in support of the national policy to deter terrorism. (David F. Brown)

(Middle) This two-seat, F/A-18B (BuNo 161360) of the USNTPS displays its colors as they appeared on 9 April 1995. The U.S. Navy Test Pilot School operates from NATC Patuxent River, Maryland. The Patuxent River (commonly referred to as "Pax River") NAS Complex stretches across 25 miles of shoreline at the mouth of the Patuxent River on Chesapeake Bay, 65 miles southeast of Washington, D.C. (John Gourley)

(Bottom) The F/A-18A (BuNo 163096) was lost 5 February 1991. VFA-87 "Golden Warriors" transitioned from the A-7 to the MDD F/A-18A Hornet on 24 October 1986. The Golden Warriors were redesignated VFA-87. On October 1987, VFA-87 joined CVW-8, the world's most powerful sea-going air wing, onboard the USS Theodore Roosevelt (CVN-71). For their first time with the F/A-18A Hornet, VFA-87 deployed on 30 December 1988. On 28 December 1990, following the Iraqi invasion of Kuwait, VFA-87 deployed for Operation Desert Storm and flew 629 sorties over 43 days of intense combat to liberate Kuwait. (John Gourley)

(Bottom Left) The F/A-18 Tactical Reconnaissance System is a real-time or near real-time imaging system for image acquisition, data storage, and data link. This imaging system consists of the Advanced Tactical Air Reconnaissance System (ATARS) with infrared (IR) and visible light sensors, two digital tape recorders, and a Reconnaissance Management System (RMS) that includes an interface with the APG-73 Radar Upgrade (Phase II). The RMS records synthetic aperture radar (SAR) imagery and has a digital data link mounted in a centerline pod. ATARS fits in the nose of any post-Lot 14 F/A-18D in place of the nose gun and has a small datalink pod mounted on the centerline station. (John Gourley)

(Top) Pilot and RIO hold their hands in sight of the ground crew to signify they will not touch any controls while the ground crew inserts or removes safety pins on ordnance. The Marine Attack Squadron (VMA) All Weather (AW) 242 was redesignated as Marine All Weather Fighter Attack Squadron 242 or VMFA(AW)-242 on 14 December 1991, and the Bats began conversion to the F/A-18D Night Attack Hornet. VMFA(AW)-242 received its first aircraft in February 1991 with the final Hornet being accepted in August of that year. The Bats exceeded 3,000 total flight hours during combat operations in support of OIF II at Al Asad AB, Iraq on 30 October 2004. This F/A-18D is equipped with the recce nose and centerline Litening Pod. (USMC)

(Bottom Right) The Crew Chief directs a VMFA-533 Hornet to parking. VMFA-533 transitioned from the A-6E Intruder to the F/A-18D Hornet on 1 September 1992, and moved to MCAS Beaufort, South Carolina. This transition made them the first VMFA (AW) in the second Marine Aircraft Wing. This jet carries an AGM-84 HARM missile on the port outboard wing station. (USMC)

(Above) The VMFA-115 "Silver Eagles" jet plugs into the basket for refueling during a combat mission. It is loaded with bombs and an AGM-65 Maverick missile. In late 2001, VMFA-115 was designated a carrier squadron. This designation coincided with the first delivery of the F/A-18A+ aircraft modification. The squadron deployed with CVW-3 aboard CVN-75 in October 2002. In March 2003, the Silver Eagles fought against Iraqi forces as part of OIF, where they delivered more than 150 tons of ordnance. In October 2004, the squadron again deployed with CVW-3 aboard CVN-75 for OIF II. (USMC)

(Below) A VMFA (AW)-332 F/A-18D flies over Ramadi, Iraq. During seven months of combat operations, which included both the Iraqi Constitutional Referendum and National elections, the Moonlighters participated in Operations Rivergate, Iron Fist, Steel Cusrtain, Blue Devil, Trifecta, Tigers, Skinner, Spiderweb and Liberty Express. During this deployment, VMFA (AW)-332 flew 2406 sorties and 6,031.9 hours. The Moonlighters departed the Al Anbar province successfully on 11 February 2006 with a combat deployment of zero missed sorties. The total ordnance expended for the deployment was 50 GBU-38s, 270 GBU-12s, 23 AGM-65s, 10 5" rockets, 2 GBU-16s, 6 GBU-32s, 16 LUU-19s, and 7640 rounds of 20mm for a total of 160,966 lbs of ordnance. (USMC)

(Top Left) VMFA-232 "Red Devils" is the oldest active USMC squadron. They transitioned to the F/A-18 Hornet in 1989. In December 1990, the squadron deployed to Shaik Isa Air Base (AB), Bahrain, in support of Operation Desert Shield. On 17 January 1991, the Red Devils were among the first to cross the Iraqi border during Operation Desert Storm. During 41 days of combat operations, the Red Devils completed 740 combat missions totaling 1,390 combat flight hours. In 2005, the squadron deployed aboard a carrier for the first time in 46 years. While deployed, the squadron operated out of the Arabian Gulf and flew over 200 combat sorties totaling 1,200 hours in support of OIF. (USMC)

(Top Right) VMFA (AW)-242 "Bats" F/A-18D refuels during a 2004 combat mission. From 4 August 2004 to 16 March 2005, the Bats flew missions out of Al Asad, Iraq in support of OIF II. The Bats used the combat call sign "Profane." (USMC)

In May 2006, VMFA-232 "Red Devils" transitioned from the F/A-18C to the F/A-18A+ airframe. While the Red Devils were flying and maintaining the oldest Hornets in the active-duty Navy or USMC, the vast array of weapons and avionics systems upgrades represented a tremendous increase in combat capability. After completing five pre-deployment detachments, both afloat and ashore, the Red Devils deployed once again aboard the USS Nimitz (CVN-68) in April 2007. This time, they deployed in order to support Operation Enduring Freedom (OEF). (USMC)

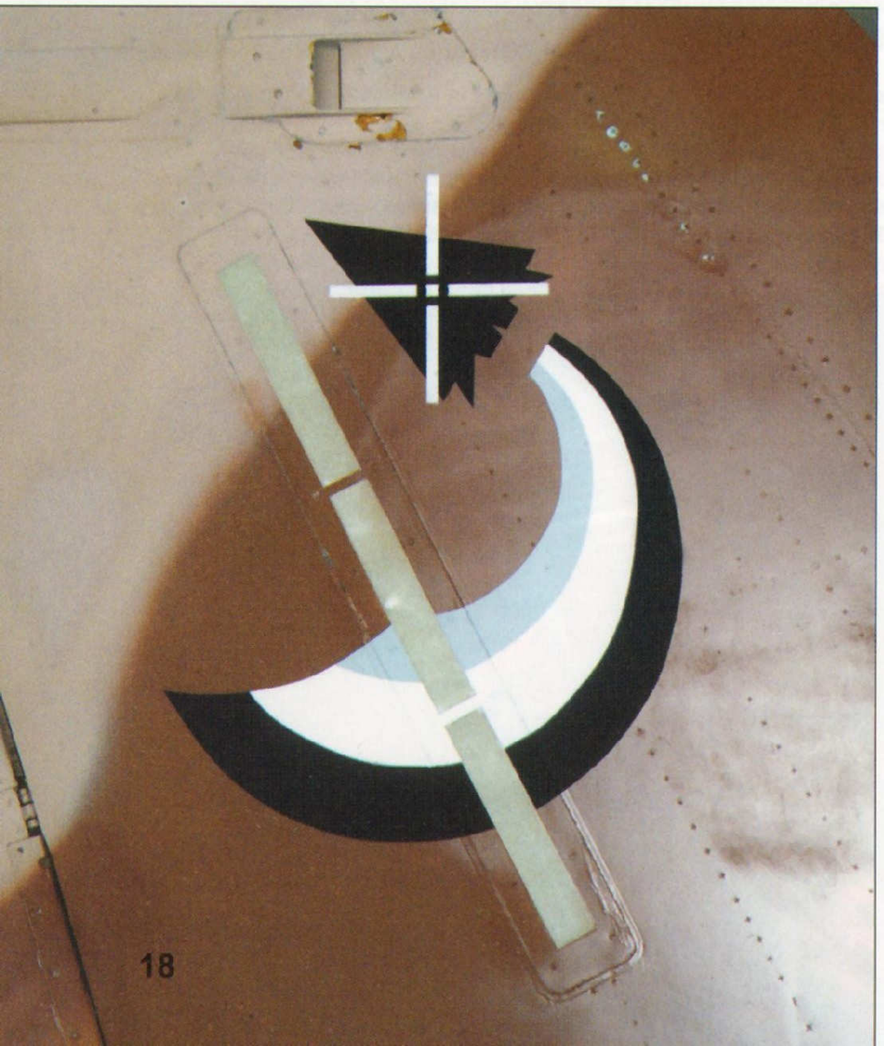
(Top Left) A VMFA-142 F/A-18+ approaches the basket for refueling during a combat mission in Iraq. In February 2005, VMFA-142 became the first fixed wing USMC reserve unit activated to combat since the Korean War. They deployed in support of OIF and served at Al Asad AB, where they provided combat support in the Al Anbar province of Iraq until September 2005. (USMC)

(Top Right) A refueling probe extends on VFA-147 F/A-18C at NAS LeMoore in August 2005. The Argonauts are part of CVW-9, onboard USS John C. Stennis (CVN-74). (Andre Jans)

(Below) A VMFA(AW)-224 F/A-18D is decorated in colorful squadron commander's markings. On 6 March 1993, the squadron was redesignated VMFA(AW)-224 and moved to MCAS Beaufort, South Carolina where the Bengals transitioned from the A-6E to the multi-mission F/A-18D Hornet. (USMC)

F/A-18D on short final. After flying the A-7 Corsair II for 11 years, the "Rough Raiders" were re-established as VFA-125, the Navy's first F/A-18 squadron, on November 13 1980. Their first aircraft arrived five months later when the U.S. Navy Test and Evaluation Squadron (VX)-4 transferred Hornet number F-11, after completing their fleet evaluation process. In addition to training U.S. Naval aviators, VFA-125 trains foreign Hornet pilots. Several of their Hornets carry camouflage markings. (Andre Jans)

This F/A-18A carries the squadron badge on the starboard vertical fin. All VFC-12 aircraft are camouflaged. (John Gourley)



An F/A-18A of VFC-12 displays its tail markings. The camouflage and markings are Russian derivatives, appropriate to the mission of VFC-12, which is adversary training for fleet fighter pilots. (John Gourley)

An F/A-18A of Reserve Squadron VMFA-134 displays its tail markings. The squadron was redesignated to VMFA-134 on 1 October 1983 and assigned to USMC Aircraft Group 46 at MCAS El Toro. (John Gourley)

(Bottom) *11 August 2005.* An F/A-18B Hornet, assigned to VFC-12 "Fighting Omars," prepares to make an arrested landing on the flight deck of the Nimitz-class aircraft carrier CVN-76 as on-deck crewmen look on. VFC-12 pilots are Naval Aviators first, and must re-qualify on carriers. (U.S. Navy photo by Senior Chief Photographer's Mate Mahlon K. Miller)

(Top Right) The VFC-12 "Fighting Omars" represent NAS Oceana's only Naval Reserve squadron. In 2004, VFC-12 received the Battle "E," Noel Davis award, for being the best squadron in category for CVW-20 by conducting what has historically been the most dynamic and demanding of all flying–ACM. (John Gourley)

(Top Left) *NAS Lemoore, August 2005.* An F/A-18C of VFA-125 displays its splinter camouflage and prominent Soviet star on the tail, which indicates its use as an adversary aircraft. (Andre Jans)

(Above) An F/A-18+ of VMFA-312 displays its markings while aboard CVN-65 on February 2004.

(Below) An F/A-18C of VFA-83 "Rampagers" displays its "Hellcats To Hornets" anniversary markings.

April 1989. **A pair of VFA-82 F/A-18C Hornets demonstrate their weapons carrying capabilities. Prior to actual combat in the Hornet, many people speculated about the combined role of "Fighter/Attack." Those apprehensive about the Hornet's capabilities labeled it "jack-of-all-trades, master-of-none" to denigrate the plane. Publicity photos were meant to demonstrate the variety of weapons that could be employed. (MDD)**

F/A-18C

The advanced F/A-18C made its first flight on 3 September 1986 from Lambert Field in St. Louis, Missouri. MDD test pilot Glen Larson was at the controls. The F/A-18C was the culmination of an improvement program aimed at making significant improvements to the basic F/A-18A. The prototype was delivered to the NAS Patuxent River for testing, and the first production F/A-18C was delivered just a year later. Although the only external changes were the addition of several new antennas, the capabilities of the Hornet were upgraded by giving the aircraft the capability of launching the AIM-120 AMRAAM and the IR imaging AGM-65 Maverick. The F/A-18C was also equipped with the AKY-14 (XN-6) Mission Computer, which had an increased memory (twice as much as its predecessor) and a faster processor. Mission information was stored on cassettes for easier and faster computer access.

In 1990, Hughes Aircraft began work on an upgrade of the APG-65 radar under a $223 million full-scale development contract. The new radar, designated APG-73, had three times the speed and memory of the APG-65 and would be installed in new production Hornets beginning in 1994. Additionally, the new radar could be retrofitted on all F/A-18C/D aircraft. The Hughes APG-73 radar had the ability to detect airborne targets at more than 100 miles, distinguish low-flying or slow-moving targets "on the deck," pinpoint ships at sea, map the contours of the ground, and track ground targets. F/A-18Cs had synthetic aperture ground mapping radar with a Doppler beam sharpening mode that generated ground maps. The ground mapping capability gave crews the capability to locate and attack targets in adverse weather and poor visibility or to precisely update the aircraft's location relative to targets during the approach.

Forty Eight F/A-18D, two-seat Hornets were configured as the F/A-18D (RC) reconnaissance version. With this version, the M61A1 cannon was replaced by a pallet-mounted electro-optical suite comprised of a blister-mounted IR line scan and two roll-stabilized sensor units, which recorded on video tape. The pallet-mounted gun and external gun compartment doors were removed and replaced by the camera system and bulged camera compartment doors that contained the camera windows. A fairing over the gun port completed the conversion.

From 1989 onward, production Hornets were delivered with night attack capability provided by GEC Avionics night vision goggles (NVGs), which worked by amplifying moonlight, starlight, or reflected light from ground sources. The F/A-18C Night Attack Hornet had a pod-mounted Hughes AN/AAR-50 thermal imaging navigation set (TINS) mounted on a fuselage station, a Loral AN/AAS-38 Nite Hawk FLIR targeting pod, and GEC Cat's Eyes pilot's night vision goggles. The Hughes AAR-50 FLIR, contained in the

The Mediterranean Sea, 11 April 2003. **Two F/A-18 Hornets assigned to the "Gunslingers" of VFA-105 fly close air support (CAS) missions for coalition special operations forces. CVN-75 and CVW-3 were deployed conducting combat missions in support of OIF. (U.S. Navy photo by Cmdr. Tom Lalor)**

(TINS) pod, was linked to a Kaiser HUD. The NVG compatible cockpit displays provided the subdued instrument lighting necessary to maintain the effectiveness of the NVG goggles. Information from multifunction displays and a color digital moving map display were stored on a laser disk to provide mission intelligence information. The F/A-18C and two-seat F/A-18D Hornets were equipped with a flight incident recorder and monitoring set (FIRAMS) commonly known as "the black box." The FIRAMS was linked with an integrated fuel and engine indicator and data storage set for recording maintenance and flight incidents data. A signal data processor interfaced with the fuel system to provide overall system control and enhanced BIT capability and automatic center-of-gravity adjustment as fuel was consumed.

The F/A-18C used the Navy Air Common Escape System (NACES), embodied in the Martin Baker ejection seat and associated survival equipment (NACES is the Navy's attempt to standardize all ejection seats used in naval aircraft).

Beginning in 1988, production Hornets were delivered with a "LEX Fence" installed on the top of each wing LEX. The LEX Fence was a 32 inch long by 8 inch high piece of metal, which reduced fatigue on the vertical tails and increased the service life of the F/A-18. The LEX Fences were retrofitted to all Hornets that remained in service. The LEX Fence was developed after cracks were found in the vertical fins of F/A-18A/B aircraft. The cracks were caused by the LEX vortices created by high AOA maneuvers. Since the Hornet lived at high AOA in combat, a fix was critical to its continued service and an 8 month test program was conducted to find the proper shape, size, and placement of the LEX Fences. In 1992, F/A-18C/Ds on the production line were refitted with the more powerful General Electric F-404-GE-402 engines, which had 20 percent more thrust than the original F-404-GE-400 engines used on earlier Hornets. The first production Hornets with the new engines were export models for Kuwait, which were delivered during early 1992. Other avionics installed in the F/A-18C included a Collins AN/ARN-118 TACAN, AN/ARC-182 UHF/VHF comm and DF-301E UHF/DF, Magnavox AN/ALR-50 and Litton AN/ALR-67 Radar Warning Receivers, GEC Ferranti Type 117 laser designator, Goodyear AN/ALE-39 Chaff Dispenser, Sanders AN/ALQ-126B ECM, Harris AN/ASW-25 radio data link, Baton AN/ARA-63 receiver-decoder, GEC Ferranti FID 2035 horizontal situation indicator (HSI), Bendix/King HSI, J.E.T. ID-179 I/A flight director indicator, and the Litton AN/ASN-130A inertial navigation system plus global positioning system (GPS).

Displays are on Kaiser multifunction CRTs, GEC Ferranti-Bendix/King CRT, Kaiser AN/AVQ-28 HUD, and ITT/Westinghouse AN/ALQ-165 airborne self protection jammer (ASPJ). However, the Pentagon announced that budgetary constraints forced cancellation of the AN/ALQ-165 ASPJ program, which left F-14D and F/A-18C/Ds without internal electronic countermeasures (ECM) protection. Subsequent combat in the Balkans forced the military to authorize additional funding for the ASPJ pending development of a more robust system. At approximately $47 million, 123 ASPJs were acquired.

Performance of the F/A-18C included a maximum speed of Mach 1.8 plus an approach speed of 134 Knots, a combat ceiling of 50,000 feet, a combat radius of 290 nautical miles, and an unrefueled ferry range (with external tanks) of 1,800 nautical miles.

On 18 May 1998, the Navy announced that its East Coast F/A-18 squadrons would relocate from NAS Cecil Field, Florida to NAS Oceana, Virginia and MCAS Beaufort, South Carolina. NAS Cecil Field was ordered to close by the 1995 Base Realignment and Closure Commission. Nine operational squadrons and the Fleet Replacement Squadron moved to Oceana. Two squadrons moved to Beaufort.

Throughout its service, annual upgrades to F/A-18 weapon systems, sensors, and so on continued. The latest lot of the F/A-18C/D grew to be far more capable than the original F/A-18A/B. However, by 1991, avionics cooling, electrical, and space constraints would begin to limit future growth. Additionally, another operational deficiency developed. As the F/A-18C/D empty weight increased, the aircraft returned to the carrier with less than optimal reserve fuel and unexpended weapons. The additional range and "bring back" was not as essential to shore based operations.

The F/A-18A/B/C/D aircraft will fly for years with the USMC and eight international customers: Australia, Canada, Finland, Kuwait, Malaysia, Spain, Switzerland, and Thailand. Although the F/A-18C/D's future growth is now limited, this fighter plane will continue to fill a critical role in the U.S. Navy's carrier battle group for many years to come and will be an excellent complement to the larger, longer range, and more capable F/A-18E/F Super Hornet.

The additional demands placed on all combat aviation arms of the United States in waging the worldwide war on terror accelerated the projected fatigue life of many tactical aircraft. In the case of the F/A-18, a program called "Center Barrel Replacement Plus" (CBR+) replaced

load sensitive structure with new structure and gave Hornets extended time in their strike fighter role until replacement aircraft phased into fleet units.

The "center barrel" is the critical center part of the aircraft fuselage that supports the wings and landing gear. The center barrel is also the part that is most susceptible to fatigue. The replacement is made to extend the life of Hornets. When the C model was new, the technology to make this kind of repair did not exist. When a Hornet made a hard landing on a carrier deck, damage to the center barrel area often occurred. This damage was beyond anyone's capability to repair, and lead to the possibility of the aircraft being struck from inventory even if that aircraft was only a few hours old.

The Navy requested a way to repair the low-use Hornet rather than strike it. The estimated cost was $16 million, and 3 years were needed to design and build the fix. The Naval Aviation Depot (NADEP) North Island team researched the problem and designed and built the fixture in 18 months at a cost of $4 million. The actual repair cost was $2 million for a total repair cost of $6 million.

The Hornet was originally forecast to have a service life of 20 years. This life estimate was based on an average of 100 carrier landings per year and aircraft experiencing normal loads (fatigue). This projected usage also anticipated sharing the attack role with the newly re-winged A-6 Intruder. Retirement of the Intruder and additional combat missions required increased operational capability. The F/A-18A was gradually replaced on the carriers by the more capable F/A-18C. The F/A-18C became the carrier workhorse and accelerated the approach of the service life limits of the Hornet.

The CBR+ prototype effort began in December 2000 and completed in 2001. With 355 Hornets scheduled to receive CBR+ upgrades by 2012, a peak demand of 45 aircraft per year is expected in 2009, based on current aircraft usage. Average cost per aircraft for the CBR+ effort was projected at $2 million. A second fixture constructed in 2001 helped meet the upgrade demand with NADEP North Island working in the Maintenance, Corrosion, and Paint Program and performing the new work.

(Right) *Persian Gulf, 24 January 2005.* A pilot assigned to the "Gunslingers" of VFA-105 turns his F/A-18C Hornet toward one of the four steam-powered catapults in preparation of being launched off the flight deck of CVN-75. CVW-3 embarked aboard CVN-75 and provided CAS. CVW-3 also conducted intelligence, surveillance, and reconnaissance missions over Iraq. The green, yellow, and red lights on the nose gear operate in conjunction with the carrier landing system to signal the Landing Signal Officer (LSO) to the position of the aircraft relative to the glideslope. (U.S. Navy photo by Photographer's Mate Airman Kristopher Wilson)

(Below) An F/A-18 C displays its CAG markings. On 11 June 1998, CVW-14 moved from NAS Miramar in San Diego to NAS Lemoore and deployed on CVN-72 for WESTPAC '98 where it participated in Operation Southern Watch and Maritime Interdiction Operations in the Arabian Gulf. CVW-14 returned to NAS Lemoore on 7 December 1998. (David F. Brown)

(Bottom Left) *Persian Gulf, 26 December 2004.* A Sailor, assigned to the "Gunslingers" of VFA-105, performs final pre-launch checks on one of his squadron's F/A-18C Hornets prior to launch from the flight deck of the Nimitz-class aircraft carrier CVN-75. Embarked CVW-3 provided CAS and conducted intelligence, surveillance, and reconnaissance missions over Iraq. The LBG-armed Hornet is attached to the waist catapult. (U.S. Navy photo by Photographer's Mate Airman Kristopher Wilson)

(Top) The Carrier Air Group (CAG) jet of VFA-34 "Blue Blasters" soars overhead. On 30 September 1996, VA- 34 was redesignated VFA-34 and returned to NAS Cecil Field, Florida. The Blue Blasters immediately began the transition to the Boeing F/A-18C Hornet from the Grumman A-6E Intruder. While assigned to CVN-67 and CVW-17 during 2004, the Blue Blasters flew sorties in support of OIF. (U.S. Navy)

(Bottom Right) The M-61 20mm cannon is carried in the nose of the Hornet. The M61A2 20mm light weight (most of the weight savings was achieved by machining down the barrel thickness) gun is used in the F/A-18 aircraft only. The gun system is mated to a linkless ammunition storage and handling system. The F/A-18 has a capacity of 578 rounds of 20mm linkless M-50 or PGU series electrically primed ammunition. The M61 20mm cannon is an operationally proven gun dating back to the 1950s. (John Gourley)

(Top) *Pacific Ocean, 28 January 2007.* Sailors aboard CVN-76 prepare a VFA-113 F/A-18C Hornet for launch as a VFA-22 F/A-18E Super Hornet a touch and go. CVN-76 CCSG was on a surge deployment in support of U.S. military operations in the Western Pacific. (U.S. Navy photo by Mass Communication Specialist 2nd Class Aaron Burden)

(Bottom Left) An F/A-18C of VFA-195 "Dambusters" displays its markings. On 1 April 1985 the Dambusters were redesignated from VA-195 to VFA-195 when they transitioned from the A-7 Corsair II to the F/A-18 Hornet. VFA-195 was assigned to CVW-5 and joined the Forward Deployed Naval Forces in Yokosuka, Japan on 1 July 1986. While ashore, the Dambusters operated out of the Naval Air Facility (NAF) in Atsugi, Japan. In the fall of 1988 and again in 1989, the squadron embarked aboard USS Midway (CV-41) and made deployments to the Indian Ocean as well as several shorter deployments in the Western Pacific. (U.S. NAVY)

(Bottom Right)The Lockheed Martin AAS-38A/B Nite Hawk FLIR, such as the AAS-38 mounted on the F/A-18C in this photo, is the Night Attack Hornet laser target designation system for laser-guided munitions delivery. Mounted on the port fuselage (Station 4), the AAS-38 enhances the Hornet's night attack capability by providing real-time FLIR thermal imagery displayed on one of the cockpit CRTs and the HUD. The AAS-38 FLIR can be fully integrated with other Hornet avionics, and data from the unit is used for the calculation of weapons release solutions. (John Gourley)

North Arabian Gulf, April 2003. A VFA-27 "Royal Maces" F/A-18C receives the launch signal from the catapult officer aboard CV-63.

(Bottom Left) *2 November 2001.* An F/A-18 "Hornet" from the VFA-195 "Dambusters" readies for launch off the flight deck of USS Kitty Hawk (CV-63). CV-63 conducted missions in support of OEF. (U.S. Navy Photo by Photographer's Mate 3rd Class John E. Woods)

(Bottom Right) *7 March 2002.* Armed with a 2000-pound MK-86 Joint Defense Attack Munition (JDAM), an F/A-18 "Hornet," from the VMFA-314 "Black Knights," receives the final signal for launch. The "Black Knights" embarked with CVW-9 aboard CVN-74 and conducted combat missions in support of OEF. (U.S. Navy photo by Photographer's Mate 3rd Class Jayme Pastoric)

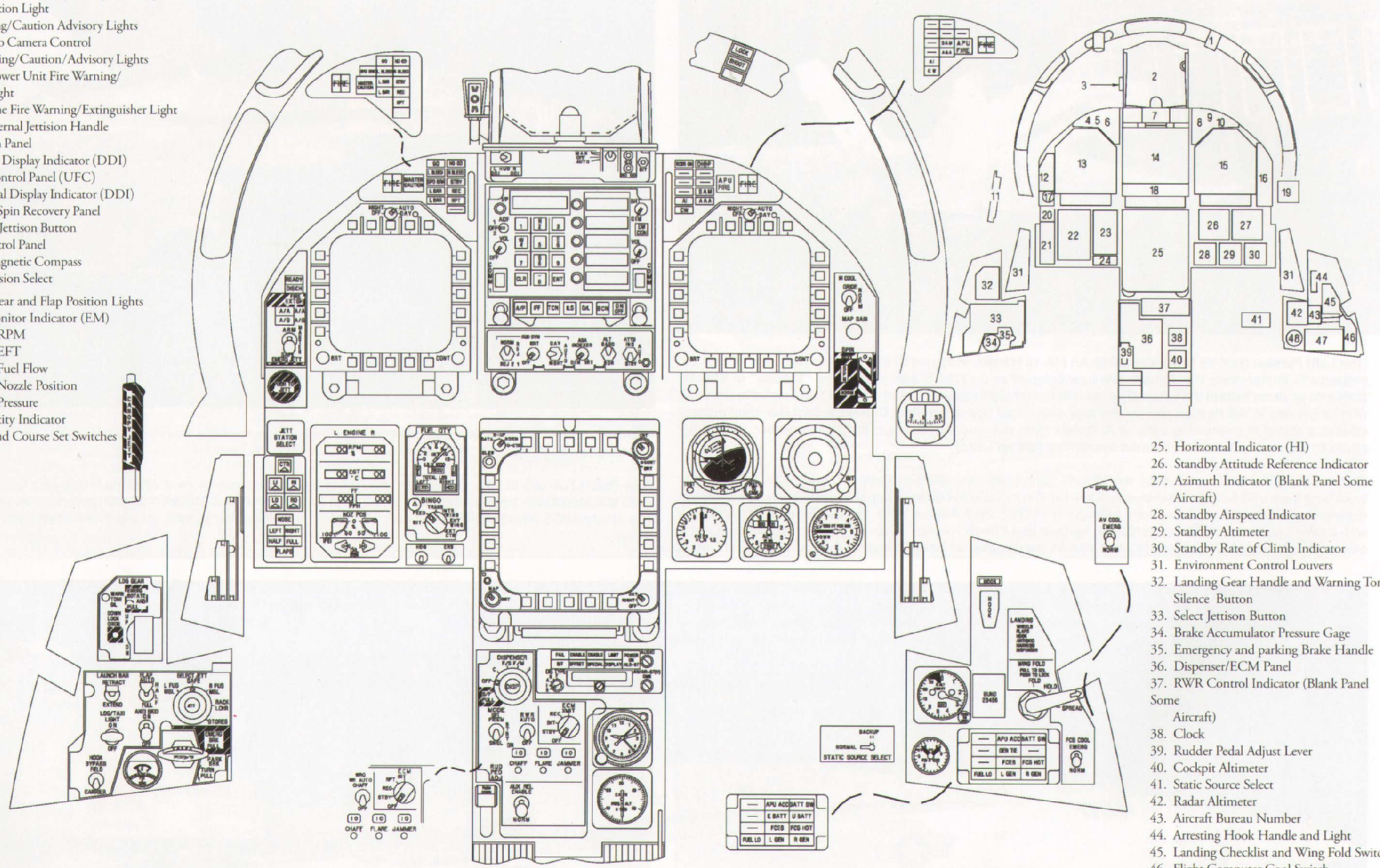
(Top Left) *Persian Gulf, 18 November 2005.* An F/A-18 Hornet, assigned to the "Golden Warriors" of VFA-87, prepares to launch from the number two bow catapult as an F/A-18, assigned to the "Valions" of VFA-15, taxis into position behind the catapult jet blast deflector (JBD) aboard CVN-71. CVN-71 and embarked CVW-8 were underway in the Persian Gulf where they supported Operation Steel Curtain, a joint U.S.-Iraqi military offensive aimed at preventing cells of Al Qaeda from entering Iraq through the Syrian border. (U.S. Navy photo by Photographer's Mate Airman Apprentice Nathan Laird)

(Bottom) An F/A-18 "Hornet," from the VFA-81 "Sunliners" assigned to CVW -17, climbs to altitude after launching from USS George Washington (CVN-73). CVN-73 and her Battlegroup were on a regularly scheduled deployment and conducted missions in support of OEF. On 7 August 1990, the Sunliners deployed along with CVW-17 aboard USS Saratoga (CV-60) for their first F/A-18 "Hornet" cruise. This deployment took place one week after Iraq invaded Kuwait, and VFA-81 participated in both Operation Desert Shield and Desert Storm as part of the Red Sea Battle Force. The Sunliners scored the Navy's only two aerial victories by downing two Iraqi MiG-21's. (U.S. Navy photo by Captain Dana Potts)

(Top Right) F/A-18C of VFA-147 flies in the fading light of the sunset over Afghanistan during OEF. This Hornet is armed with laser guided bomb (LGB) and Joint Direct Attack Munition (JDAM) precision munitions. The single AIM-9 missile reflects the lack of concern over air-to-air threats during these operations. (U.S. Navy)

Instrument Panel-Front Cockpit for F/A-18A/B Aircraft

1. Lock Shoot Lights
2. Head Up Display (HUD)
3. Angle of Attack Indexer Lights
4. Left Engine Fire Warning/Extinguisher Light
5. Master Caution Light
6. Left Warning/Caution Advisory Lights
7. HUD Video Camera Control
8. Right Warning/Caution/Advisory Lights
9. Auxiliary Power Unit Fire Warning/ Extinguisher Light
10. Right Engine Fire Warning/Extinguisher Light
11. Canopy Internal Jettision Handle
12. Master Arm Panel
13. Left Digital Display Indicator (DDI)
14. Upfront Control Panel (UFC)
15. Right Digital Display Indicator (DDI)
16. Map Gain/Spin Recovery Panel
17. Emergency Jettison Button
18. HUD Control Panel
19. Standby Magnetic Compass
20. Station Jettision Select
21. Landing Gear and Flap Position Lights
22. Engine Monitor Indicator (EM)
    - L & R RPM
    - L & R EFT
    - L & R Fuel Flow
    - L & R Nozzle Position
    - L & R Pressure
23. Fuel Quantity Indicator
24. Heading and Course Set Switches



25. Horizontal Indicator (HI)
26. Standby Attitude Reference Indicator
27. Azimuth Indicator (Blank Panel Some Aircraft)
28. Standby Airspeed Indicator
29. Standby Altimeter
30. Standby Rate of Climb Indicator
31. Environment Control Louvers
32. Landing Gear Handle and Warning Tone Silence Button
33. Select Jettison Button
34. Brake Accumulator Pressure Gage
35. Emergency and parking Brake Handle
36. Dispenser/ECM Panel
37. RWR Control Indicator (Blank Panel Some Aircraft)
38. Clock
39. Rudder Pedal Adjust Lever
40. Cockpit Altimeter
41. Static Source Select
42. Radar Altimeter
43. Aircraft Bureau Number
44. Arresting Hook Handle and Light
45. Landing Checklist and Wing Fold Switch
46. Flight Computer Cool Switch
47. Caution Lights Panel (Gen Tie on Aircraft 162394 and Up)
48. HYD 1 and 2 Pressure Indicator

(Above) *North Arabian Sea, 14 November 2003.* An F/A-18 Hornet, assigned to the VFA-82 "Marauders," patrols airspace near the North Arabian Sea in support of OEF. VFA-82 deployed with CVW-1 aboard CVN-65 in the North Arabian Sea. On 13 July 1987, VA-82 was redesignated VFA-82. The first F/A-18C was delivered in November 1987. VFA-82 became the first F/A-18C squadron. (U.S. Navy photo by Lt. J. G. Perry Solomon.)

(Below) *Iraq, 27 August 2007.* An F/A-18C Hornet, assigned to the "Knighthawks" from VFA-136, heads home after completing a CAS mission in support of U.S. and coalition ground forces. VFA-136 was assigned to CVW-1, embarked aboard nuclear-powered aircraft carrier CVN-65. VFA-136 transferred to Cecil Field NAS in February, 1986. They then transferred to NAS Oceana in December 1998. (U.S. Navy photo by Lt. Peter Scheu)

Loaded with 10 AIM-120 AMRAAM missiles (eight on four wing pylons, two on the fuselage) and two AIM-9 sidewinder missiles (one on each wingtip), an F/A-18C of VX-4 readies for testing, which began in 1991 and continued throughout the year. By late 1993, Hornet testing was winding down at VX-4 and on 30 September 1994, VX-4 was disestablished. Its assets were reassigned to the VX-9 Vampires. (Boeing)

An F/A-18C Hornet of VFA-147 "Argonauts" rolls in on a target while flying a combat mission over Iraq in March 2005. The Carl Vinson CCSG conducted operations in support of multi-national forces in Iraq and maritime security operations in the Persian Gulf. It's armament emphasizes the reliance on "smart" weapons in CAS. It carries a GBU-16, AGM-65 and GBU-38 JDAM. The GBU-38 was first used in combat in 2004. (U.S. Navy photo by Cmdr. Don Berry)

Mediterranean Sea, 21 July 2007. An F/A-18C Hornet, assigned to VFA-136 "Knighthawks," conducts a unit-level training mission. VFA-136, part of CVW-1, embarked aboard CVN-65. The Enterprise CCSG was on a scheduled six-month deployment in support of maritime security operations and the global war on terrorism. (U.S. Navy photo by Lt. Peter Scheu)

(Above) An F/A-18C of VFA-87 "War Party" is hauled to a stop during a trap aboard CVN-71 in July 2006. VA-87 "Golden Warriors" became VFA-87 when they transitioned from the A-7 Corsair II to the Hornet in October 1986. (Andre Jans)

(Below) An F/A-18C of VFA-37 "Bulls" displays its CAG markings aboard CVN-71 in July 2006. On 15 November 1990, VA-37 was redesignated VFA-37 when they transitioned from the A-7 Corsair II to the Hornet. The Bulls received their first F/A-18 Hornet on 13 December 1990. (Andre Jans)

The Blue Angels

Athe end of World War II, Chief of Naval Operations (CNO) Chester W. Nimitz ordered the formation of a flight demonstration team to keep the public interested in naval aviation. The Blue Angels performed their first flight demonstration less than a year later in June 1946 at their home base, NAS Jacksonville, Florida. Flying the Grumman F6F Hellcat, they were led by Lt. Cmdr. Roy "Butch" Voris."

(Above) The Blue Angels F/A-18A solo lead conducts a high speed pass at the Miramar Air Show at MCAS in Miramar, California. (U.S. Navy photo by Photographer's Mate Airman Mark Rebilas.)

(Above) This view comes from the slot (Number 4) position in the Blue Angels delta formation as they roll over the top in formation. The Blue Angels maintain 36" separation between aircraft in their maneuvers. (U.S. Navy)

San Francisco, California, 9 October 2005. The Navy's Flight Demonstration team, the Blue Angels, performs their delta formation over San Francisco Bay during the annual Fleet Week air show. The Blue Angels performance includes 30 maneuvers during an aerial demonstration that lasts over an hour. The Blue Angels perform more than 70 shows at 34 different locations throughout the country each year. (U.S. Navy photo by Photographer's Mate 2nd Class Ryan Courtade)

Hillsboro, Oregon, 15 August 2004. **The Blue Angels' left echelon formation rolls 270 degrees in ripple fashion to perform the Tuck Under Break at the Oregon International Air Show. This maneuver is one of the most challenging ones because the breaking aircraft rolls right to break left. (U.S. Navy photo by Photographer's Mate 2nd Class Ryan J. Courtade)**

On 25 August 1946, the Blue Angels transition to the Grumman F8F Bearcat. By the end of the 1940s, the Blue Angels were flying their first jet aircraft, the Grumman F9F-2 Panther. In 1950, the team responded to the demands placed on naval aviation in the Korean Conflict and reported to the aircraft carrier USS Princeton (CVA-37) as the nucleus of Fighter Squadron 191 (VF-191), "Satan's Kittens."

The team reorganized the next year and reported to NAS Corpus Christi, Texas, where they flew the newer, faster version of the Panther, the F9F-5. The Blue Angels remained in Corpus Christi until winter 1954. They relocated to their present home base at NAS Pensacola, Florida. In Florida, they progressed to the swept-wing Grumman F9F-8 Cougar.

The ensuing 20 years saw the Blue Angels transition to two more aircraft, the Grumman F11F-1 Tiger (1957) and the MDD F-4J Phantom II (1969). The Phantom was the most impressive formation air show airplane ever flown, but it also was the most difficult to maintain and fly in tight formation. The Blue Angels suffered several accidents before attrition forced consideration of a new airplane.

In December 1974, the Navy Flight Demonstration Team began flying the MDD A-4F Skyhawk II and was reorganized as the Navy Flight Demonstration Squadron. This reorganization permitted the establishment of a commanding officer vice a flight leader (Commander Tony Less was the squadron's first official commanding officer), added support officers, and further redefined the squadron's mission, which emphasized recruiting effort support.

On 8 November 1986, the Blue Angels completed their 40th anniversary year during ceremonies that unveiled their present aircraft, the F/A-18 Hornet. The Hornet proved to be the best plane the Blues have ever flown and will likely be their mount for years to come.

An F/A-18F Super Hornet of VFA-102 "Diamondbacks" displays its 50th anniversary livery.

April 2005. An F/A-18A+ of VMFA-142 "Gators" gets ready for a combat mission from Al Asad AB, Iraq. The Hornet is loaded with Rockeye cluster bomb units (CBUs).

Atlantic Ocean, 30 September 2005. **An F/A-18F Super Hornet, assigned to the "Salty Dogs" of VX-23, conducts a flight test mission just off the coast of Maryland. Based out of NAS Patuxent River in Maryland, VX-23 supports the research, development, test, and evaluation of fixed wing tactical aircraft and currently flies all versions of the F/A-18 Hornet, the EA-6B Prowler, and the T-45 Goshawk. This test aircraft is equipped with an instrumented air-data probe on the nose for test data collection. (U.S. Navy photo by Mr. Joe Hegedus)**

F/A-18E/F "Super Hornet"

The requirement for the Super Hornet was dictated by the retirement of the A-6 Intruder and the F-14 Tomcat. The Intruder was designed and built as the premier all-weather attack aircraft. The Tomcat was designed and built as the ultimate fleet air-to-air defender. The Tomcat became the best precision weapons delivery platform in the fleet by necessity when the Intruder disappeared from the fleet. While advances in avionics and targeting hardware made the F/A-18 A/B/C/D Hornet a deadly attacker within its operational range, the Hornet did not have the range or load capacity to rival the Intruder.

On 11 January 1988, MDD announced it was studying concepts with the U.S. Navy for an advanced version of the F/A-18 Hornet called "Hornet 2000." On 6 May 1992, the Defense Acquisition Board approved initiation of the engineering and manufacturing development (EMD) for the F/A-18 E/F program, and the contract was signed the following December. Assembly of the first E model began in May 1995, and the first 'Super Hornet' (So-named by CNO Adm. Jeremy Boorda) rolled out on 19 September 1995. The Super Hornet flew for the first time in November 1995, ahead of schedule and nearly 1,000 pounds under specified weight. The Super Hornet successfully conducted its initial sea trials on board the Navy's newest aircraft carrier, CVN-74 in January 1997.

After completing the most thorough operational evaluation in U.S. Naval history, the F/A-18E/F Super Hornet entered operational service in November 1999, and the program was awarded an unprecedented five-year multiyear contract for 211 aircraft. The first operational F/A-18E/F Super Hornet squadron, VFA-115, stood up in June 2001 and deployed aboard the USS Abraham Lincoln (CVN-72) in July 2002.

An F/A-18E Super Hornet of VFA-137 "Kestrels" displays its markings.

In April 2005, Boeing delivered the first Block II Super Hornet complete with active electronically scanned array (AESA) radar.

The program delivered the 300th Super Hornet to the U.S. Navy in January 2007. Since its inception, the Super Hornet program has remained on time, on weight, and on cost. Boeing is currently building Super Hornets under a second, five-year multiyear contract with the U.S. Navy for 210 Super Hornets. The contract runs from 2005 to 2009. Deliveries for these aircraft began in Fiscal Year 2007. The U.S. Navy plans to buy a minimum of 460 Super Hornets through 2011.

In 1999, the F/A-18 program team was awarded the prestigious Collier Trophy. The award recognizes the greatest achievement in aeronautics and astronautics in the United States, and has been called the greatest and most prized of all aeronautical honors in the country.

In April 1996, MDD and Northrop Grumman teamed to develop a plan to have an electronic warfare variant of the two-seat F/A-18F achieve initial operational capability between 2007 and 2009. The EA-18G "Growler" made its first flight in 2007.

Though it is an "F/A-18" and it is a "Hornet," the F/A-18E/F is a very different airplane from its predecessor Hornets. The F/A-18E/F is 4.2 feet longer than earlier Hornets, has a 25 percent larger wing area, and carries 33 percent more internal fuel. This additional size increases mission range by 41 percent and endurance by 50 percent. The Super Hornet has two additional weapon stations, which permits increased payload flexibility and allows air-to-air and air-to-ground capabilities on the same mission. Super Hornets carry the complete complement of "smart" weapons, which include the newest joint weapons such as JDAM and Joint Standoff Weapon (JSOW).

An F/A-18F Super Hornet, assigned to the "Bounty Hunters" of VFA-2, flies over the fantail of the Nimitz-class aircraft carrier CVN-72. The most recognizable visual differences between the early Hornet models and the Super Hornet are the enlarged wing root LEXs and the rectangular engine intakes. (U.S. Navy photo by Photographer's Mate Airman Geoffrey Lewis)

Super Hornets can carry approximately 17,750 pounds of external load on 11 stations. Additionally, the Super Hornets have all-weather, air-to-air radar and a control system for accurate delivery of conventional or guided weapons. Avionics and software have a 90 percent commonality with F/A-18C/Ds, but the F/A-18E/F cockpit features a touch screen upfront control display, a larger and multipurpose color liquid crystal display (LCD), and a new engine fuel display. The F/A-18E/F has two wing tip stations, four inboard wing stations for fuel tanks or air-to-ground weapons, two nacelle fuselage stations for Sparrows or sensor pods, and one centerline station for fuel or air-to-ground weapons. An internal 20 mm M61A1 Vulcan cannon is mounted in the nose.

Carrier recovery payload is increased to 9,000 pounds. This fact is particularly important when considering the cost of today's "smart" weapons. Being able to bring a multi-million dollar weapon back aboard when a suitable target goes unfound helps ease taxpayers' burden. Engine thrust was increased from 36,000 pounds to 44,000 pounds with the General Electric F414 turbo-fan engines. The increased thrust comes from the F414-GE-400, an advanced derivative of the Hornet's current F404 engine family. The F414 produces 35 percent more thrust and improves overall mission performance. The enlarged air inlets, which provide increased airflow to the engines, are one of the most readily identifiable features of the Super Hornet. Although the more recent F/A-18C/D aircraft have been modified with applicable low observables technology, the Super Hornet was designed and built with this technology and other survivability enhancements.

The Hughes Advanced Targeting Forward-Looking Infrared (ATFLIR), the baseline IR system for the F/A-18 E/F, will also be deployed on earlier model F/A-18s. The Hughes pod features both navigation and IR targeting systems that incorporate third generation mid-wave infrared (MWIR) staring focal plane technology.

(Top Right) An F/A-18F of VF-2 offers an underside view of its weaponry. The Super Hornet is enhanced with air-to-air, load-out AIM-9 Sidewinders on the wingtips and AIM-120s on the wing stations. (Colin Norwood)

(Bottom Left) ***Pacific Ocean, 14 July 2005.*** **F/A-18F Super Hornets, assigned to the "Bounty Hunters" of VFA-2, prepare to launch from the flight deck aboard CVN-72. VFA-2 took delivery of its first F/A-18F on 6 October, 2003. The transition to the new aircraft took only four and a half months, the shortest time ever for a Tomcat to Super Hornet transition. When CV-64 was decommissioned, VFA-2 was reassigned to CVN-72 to deploy with CVW-2. (U.S. Navy photo by Midshipman John Ivancic)**

A comprehensive spiral development design concept, which includes the addition of the APG-79 AESA radar, offers continuously improving overall mission capability and supportability. During a test at the Naval Air Weapons Center at China Lake, California, an AESA-equipped F/A-18F created a long-range, high resolution synthetic aperture radar map and designated four closely-spaced stationary targets. The aircraft then data-linked two target designations to non-AESA equipped Super Hornets, which successfully delivered four 2,000-lb. JDAMs. All four weapons impacted the targets within lethal distance. The targeting Super Hornet then used the AESA to provide highly detailed bomb damage assessments to confirm the hits. Super Hornets have also demonstrated the capability of hitting moving targets with JDAMs.

Other recently incorporated upgrades include an ATFLIR, JHMCS, multifunctional information distribution system (MIDS), and an advanced aft crew station. The F/A-18E/F has exceptional combat maneuverability, an unlimited AOA, high resistance to spins and departures, and ease of handling and training. The Super Hornet's reconfigurable digital flight control system can detect damage to or full loss of flight control and still allow safe recovery.

As of 2007, the nine operational U.S. Navy Carrier Air Wings have 19 squadrons of Super Hornets. By August 2007, 328 Super Hornets had been delivered (189 F-model Super Hornets, and 139 E-model Super Hornets).

Atlantic Ocean, 28 July 2005. An F/A-18F Super Hornet, assigned to the VFA-103 "Jolly Rogers," makes an arrested landing aboard CVN-75. The Jolly Rogers began life in 1943 as VF-17 and were subsequently redesignated VF-84. A long and rich history did not protect VF-84 from downsizing, and they were dis-established in 1995. VF-103 "Sluggers" adopted the much more colorful nom-de-guerre and markings of the erstwhile VF-84. They began transitioning from the F-14B Tomcat to the F/A-18 Super Hornet in February 2005 and were redesignated VFA-103. On 14 February 2006, VFA-103 joined the rest of CVW-7 on board the USS Dwight D. Eisenhower (CVN-69). (U.S. Navy photo by Photographer's Mate 3rd Class Kristopher Wilson)

(Top) An F/A-18E Super Hornet, assigned to VA-27 "Royal Maces," readies to trap aboard CV-63. In 1991, the Royal Maces began the transition to the F/A-18A Hornet after 23 years in the A-7E and were officially redesignated VFA-27 "Chargers." VFA-27 changed their home port to Atsugi, Japan in 1996. They completed transition to the Super Hornet in May 2004. (U.S. Navy photo by Photographer's Mate Airman Stephen W. Rowe)

(Bottom Left) *Atlantic Ocean, 13 January 2007.* An F/A-18F Super Hornet, assigned to VFA-11 "Red Rippers," gets a one wire arrestment on CVN-75's flight deck, which marked the first successful arrested landing aboard the Nimitz-class aircraft carrier in more than a year. (U.S. Navy photo by Mass Communication Specialist 3rd Class Kristopher Wilson)

(Bottom Right) An F/A-18 pilot wears the JHMCS, a multi-role system that enhances pilot situational awareness and provides head-out control of aircraft targeting systems and sensors. The JHMCS has a magnetic helmet-mounted tracker that determines where the pilot's head is pointed and is combined with a miniature display system that projects information onto the pilot's visor. The head tracker and visor display act as a targeting device that aims sensors and weapons wherever the pilot is looking. Warfighters used JHMCS operationally for the first time during OIF. By placing an aiming cross, projected on the helmet visor, over the desired target and pressing a button, pilots can aim weapons and sensors to designate and attack airborne or ground targets. JHMCS also displays aircraft altitude, airspeed, attitude, and tactical information on the visor to increase situational awareness. (U.S. Navy photo by Seaman Kevin T. Murray Jr.)

(Above) *Pacific Ocean, 14 August 2003.* Flight deck crew, aboard CVN-74, make final preparations to launch an F/A-18F "Super Hornet," assigned to the "Diamondbacks" of VFA-102. Following the return from deployment and OEF in 2002, VF-102 was assigned to Commander, Strike Fighter Wing Pacific and transferred to NAS Lemoore in California to transition from the F-14 Tomcat to the F/A-18F Super Hornet. The Diamondbacks were redesignated VFA-102 in 2002. (U.S. Navy photo by Photographer's Mate Airman Andre Rhoden)

(Below) *Tasman Sea, 4 July 2007.* A pilot flies Australian Defense Minister Dr. Brendan Nelson past CV-63 in an F/A-18F Super Hornet assigned to VFA-102. Nelson toured the ship with nearly 40 other Australian guests. CV-63 recently completed exercise Talisman Saber with Australian and other U.S. Navy and USMC forces in the Coral Sea. Australia is one of the foreign Hornet operators. This Super Hornet is configured as a tanker that carries four, 480 U.S. gallon external fuel tanks plus an Aerial Refueling Store (ARS), or "buddy store." (U.S. Navy photo by Mass Communication Specialist Seaman Kyle D. Gahlau)

(Left) A Hornet takes on fuel from the extended hose and basket of an ARS on a Super Hornet tanker. All Navy aircraft use this probe and drogue refueling system while USAF aircraft are configured for receptacles on the receiver, which are plugged into by boom operators on the tanker aircraft. (U.S. Navy)

(Below) *Bay of Bengal, 7 September 2007.* An F/A-18F Super Hornet of VFA-102 conducts exercise Malabar 07-2. More than 20,000 personnel from the navies of the United States, Australia, India, Japan, and Singapore participated in the exercise. The significantly enlarged LEXs of the Super Hornet provide improved vortex lifting characteristics in high AOA maneuvers and reduce the static stability margin, which enhances pitch characteristics. The result is pitch rates in excess of 40 degrees per second. (U.S. Navy photo by Mass Communication Specialist 2nd Class Jarod Hodge)

(Top Left) *13 January 2003.* Photographer's Mate Airman Brian Evaul of Banner Elk, N.C., and Photographer's Mate Airman James Broody of Atlanta, Ga., install the data storage unit into the Shared Reconnaissance Pod (SHARP), located on the bottom of this F/A-18F Super Hornet that is assigned to VFA-41 "Black Aces." The (SHARP) is a multi-functioned reconnaissance pod that is adaptable to several airborne platforms for tactical manned airborne reconnaissance. The SHARP is capable of simultaneous airborne and ground screening capabilities and is designed to replace the Navy's Tactical Airborne Reconnaissance Pod System (TARPS), which was carried by the F-14 Tomcat. (U.S. Navy photo by Photographer's Mate 3rd Class Yesenia Rosas)

(Top Right) *August 2005.* A VFA-137 F/A-18E takes off from NAS Fallon in Nevada. The nose landing gear retracts forward while the main gear rotates 90 degrees before retraction into the aft fuselage. (Andre Jans)

(Bottom) *Pacific Ocean, 28 October 2004.* An F/A-18E Super Hornet, assigned to the "Kestrels" of VFA-137, performs an inflight refueling evolution with an F/A-18C Hornet, assigned to the "Marauders" of VFA-82. VFA-137 and VFA-82 were assigned to CVW-2 aboard CVN-72. CVN-72 and CVW-2 were deployed to the Western Pacific Ocean. One of the significant characteristics of the Super Hornet is its ability to return to an aircraft carrier with a larger load of unspent fuel and munitions than the original Hornet. The term for this ability is known as "bringback." Bringback for the Super Hornet is in excess of 9,000 pounds. (U.S. Navy photo by Lt. Perry Solomon)

(Above) *Arabian Sea, 7 February 2007.* An F/A-18F Super Hornet, assigned to the "Jolly Rogers" of VFA-103, lands aboard the Nimitz-class aircraft carrier CVN-69. Demonstrating the Super Hornet bringback, it is returning with a very expensive LGB. The Super Hornet also carries an AIM-9M on the starboard wingtip. The AIM-9M is the only operational Sidewinder variant. It has the all-aspect capability of the L model but provides all-around higher performance. The AIM-9M has improved defense against IR countermeasures, enhanced background discrimination capability, and a reduced-smoke rocket motor. These modifications increase the missile's ability to locate and lock-on a target and decrease the missile's chances for detection. Deliveries of the M model began in 1983. (U.S. Navy photo by Mass Communication Specialist Seaman Travis Alston)

(Below) *Pacific Ocean, 11 November 2005.* An F/A-18F Super Hornet, assigned to the VFA-102 "Diamondbacks," prepares for launch from the flight deck of CV-63. CV-63 and embarked CVW-5 were conducting operations in the Western Pacific Ocean. This Hornet carries the Diamondbacks 50th Anniversary markings. (U.S. Navy photo by Photographer's Mate 3rd Class Jonathan Chandler)

In a hangar bay aboard CVN-72, sailors, assigned to the "Kestrels" of VFA-137, perform maintenance on an F-414-GE-400 jet engine used in an F/A-18E Super Hornet. The F414 engine is more powerful, durable, reliable, and easy to maintain than F404 family engines. The F414 engine also works with higher temperatures and pressures due to the use of new materials and cooling techniques. (U.S. Navy photo by Photographer's Mate Airman Jordon R. Beesley)

A VFA-102 Plane Captain applies an electro-static discharge "hand" to a canopy on one of his squadron's F/A-18F Super Hornets aboard CV-63. Static electricity builds on an airframe as it moves through the atmosphere, and certain conditions promote more of this phenomenon. Deck personnel do not want to touch recently trapped airframes that are loaded with static electricity. (U.S. Navy photo by Photographer's Mate Airman Jonathan Chandler)

(Above) *Pacific Ocean, 31 July 2007.* Capt. Michael Manazir, commanding officer of the nuclear-powered aircraft carrier CVN-68; Capt. David Woods, former Commander of CVW-11; and Capt. Thomas Downing, commander of CVW-11; fly by CVN-68 in F/A-18E and F/A-18F Super Hornets during an airborne change of command ceremony for CVW-11. The Nimitz Strike Group and embarked CVW-11 were deployed in the U.S. 7th Fleet. CVN-68 was named for famed WWII Fleet Admiral Chester Nimitz. The ship was christened by Catherine, his oldest daughter, in May 1975. (U.S. Navy photo by Lt. Cmdr. Brian Knoll)

The F/A-18F of the VFA-11 squadron commander turns final at NAF El Centrol in August 2005. On 1 March 2005, VF-11 was redesignated VFA-11 as they transitioned to the F/A-18F Super Hornet from F-14D Tomcats. On 6 April 2006, the Red Rippers joined the George Washington CCSG with CVW-17. (Andre Jans)

8 June 2007, Persian Gulf. Two F/A-18E Super Hornets from the "Tophatters" of VFA-14 move into position on the waist catapults during flight operations as the guided-missile cruiser USS Princeton (CG-59, CVA-59 in Korean War) steams alongside nuclear-powered aircraft carrier CVN-68. Nimitz CCSG and embarked CVW-11 are deployed in 5th Fleet conducting maritime operations and supporting troops participating in the global war on terrorism. The Red Rippers were redesignated VFA-11 when they transitioned to the F-18E/F Super Hornet from the F-14 Tomcat. (U.S. Navy photo by Mass Communication Specialist 2nd Class Kristen Allen)

Hampton, Virgina, 14 May 2005. An F/A-18F Super Hornet, assigned to the "Jolly Rogers" of VFA-103, and a Korean War-vintage FG-1D Corsair fly in formation during the Navy Legacy Flight at the 2005 Air Power over Hampton Roads air show held on board Langley Air Force Base, Virginia. The original U.S. Navy "Jolly Rogers" squadron, VF-17, flew Corsairs in World War II. The juxtaposition of these two Navy fighters is graphic testament to the advances in military aviation over the last six decades. (U.S. Navy photo by Photographer's Mate 2nd Class Daniel J. McLain)

Mount Fuji, Japan, 12 April 2007. An F/A-18E Super Hornet of VFA-27 performs aerial maneuvers during a photo exercise in front of Mount Fuji. VFA-27 is assigned to CVW-5 embarked aboard CV-63. The Super Hornet has an additional wing stores station and increased horizontal tail area compared to the Hornet. (U.S. Navy photo by Mass Communication Specialist 3rd Class Jarod Hodge)

EA-18G Growler

The U.S. Navy selected the EA-18G Airborne Electronic Attack (AEA) system to replace the EA-6B Prowler aircraft. Like the Prowler, the EA-18G provides full-spectrum electronic attack to counter enemy air defenses and communication networks. Boeing and the U.S. Navy signed a five-year System Development and Demonstration contract on 29 December 2003. The Growler is built on the Super Hornet (F/A-18F) airframe , with changes specific to the Electronic Countermeasures (ECM) mission. Transforming the F/A-18F into the EA-18G requires minimal structural changes and has only a minor impact on aircraft growth margin. October 2004 marked the assembly of the first EA-18G flight test aircraft, and this aircraft moved into modification, ahead of schedule, in late April 2005. The first two EA-18G flight test aircraft, EA-1 and EA-2, were delivered ahead of schedule. The aircraft currently are undergoing flight tests at NAS Patuxent River, Maryland. The first production aircraft made its first flight on 10 September 2007 and was delivered to the U.S. Navy on 24 September 2007, almost a month ahead of schedule. The EA-18G will initially be used in the flight test program at NAS Patuxent River before entering fleet service. The Growler is expected to complete developmental flight testing in 2008, and initial operational capability (IOC) will follow in 2009.

The Growler carries ALQ-218(V)2 RF receiver; multi-mission advanced tactical terminal communications; Electronic Support Measures (ESM)receiver; AESA radar (having growth capability as receiver and jammer asset); ALQ-99 pods in various bands under wings and fuselage; and ALQ-227 comms communication receivers. (Boeing)

The first production EA-18G carries the markings of Electronic Attack Squadron One Two Nine (VAQ-129) "The Fighting Vikings." VAQ-129 is the only EA-6B training squadron. The squadron's mission is to train all Navy, USMC, and USAF aircrew that will fly in the Prowler. It is based at NAS Whidbey Island, Washington, which is located at Puget Sound on Whidbey Island. They will assume the same EA-18G duty when the Growler becomes operational. The wing-tip pods on the EA-18G carry low-band, mid-band and high-band acquisition and DF antenna arrays. The pallet in the gun bay will carry a processor, channelized receiver, digital measurement receiver, power supply, and communications countermeasures set receiver. (Boeing)

Export Hornets

The F-18L was proposed as a lighter land-based version of the F-18 Hornet. The F-18L was designed to be a single-seat air-superiority fighter and ground-attack aircraft. It was originally intended to be built by Northrop as the export version of the F-18 Hornet, similar to the YF-17 or P-530 Cobra. Probably because potential customers could not be sure that the F-18L would receive the same upgrades as the F/A-18, they opted for the U.S. version.

Canada was the first international customer for the F/A-18, and its fleet of 138 Hornets is the largest outside the United States. The CF-18s operated out of Canadian Forces Base in Cold Lake, Alberta, and Canadian Forces Base in Bagotville. The first CF-18B, a two-seat model of the Hornet, was delivered on 26 October 1982 to the Canadian Forces 410 Squadron at Cold Lake. This squadron accumulated more than 100,000 flight hours and trained almost 60 pilots in CF-18s. Phase I of the Canadian Hornet Modernization Program was completed in August 2006. This program upgraded the Canadian Hornet fleet's avionics, radio, and weapons capabilities. Phase II of the CF-18 modernization program added a data link system, a helmet-mounted sight system, new color cockpit displays and a new chaff- and flare-dispensing electronic warfare system to 79 CF-18 Hornets. The expected completions for Phase II is March 2010.

The first F/A-18 Hornet was delivered to the Royal Australian Air Force (RAAF) on 29 October 1984. "F-18 A" was the original company designation; designations of "AF-18 A" & "ATF-18 A" have also been applied. Subsequent to delivery of the first two MDD-built F-18s, Aero-Space Technologies of Australia (ASTA) assembled the Aussie Hornets from kits produced by MDD. Some parts were eventually manufactured in Australia. The most notable differences between an Australian (A)F-18 A/B and its American counterpart were the lack of a catapult attachment, replacement of the carrier tail hook for a lighter arresting hook, and the replacement of the automatic carrier landing system with an Instrument Landing System. Australian Hornets have been involved in a number of major upgrade programs. This program, called Hornet Upgrade (HUG) has had a few evolutions over the years. The first evolution was completed in 2002. Hornets were upgraded to C/D model avionics and included replacement of the APG-65 radar with the APG-73. The second and current upgrade program (HUG 2.2) updated the fleet's avionics to beyond E model Hornet capability.

Spain bought 72 Hornets (60 Single-seat EF-18A, and 12 two-seat EF-18Bs). The Spanish Air Force designation was C-15 for the A model and CE-15 for the B model. Initial deliveries began in July, 1986. Spanish Hornets performed the all-weather interceptor role and were initially ordered with AIM-7 Sparrows and AIM-9 Sidewinders. The Spanish Hornets were subsequently upgraded for the AIM-120. The air-to-ground mission is flown using a variety of Spanish armament.

Royal Canadian Air Force (RCAF) Flight Demonstration Team F/A-18A carries 75th Anniversary Markings for the 1999 Saskatoon, Saskatchewan air show. (Author's collection)

May 2000. **A CF-188A of 3 RCAF Wing, Bagotville, Quebec, Canada displays its 60 year anniversary markings at Langley Air Force Base (AFB). RCAF Hornets flew combat missions in Desert Storm and Kosovo. (Author's collection)**

The Kuwait Air Force ordered 40 C and D models in 1988. Although the Gulf War delayed delivery, the first Kuwaiti Hornets were delivered in January 1992. Kuwaiti Hornets were flown by Numbers 9 and 25 Squadrons and were based at Amed al Jaber AB. Kuwait's Hornets were designated KAF-18C/D.

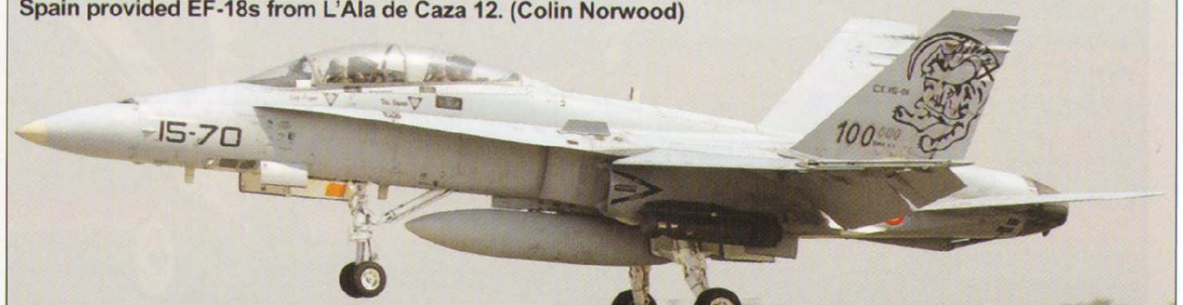
The 26 May 1997 delivery of four two-seat model Hornets to Malaysia marked the completion of an order placed by the Royal Malaysian Air Force (RMAF) in June 1993. The first four aircraft were delivered on schedule to Malaysia. Eight U.S. Navy and USMC pilots manned the controls as the aircraft made their way to Malaysia. The four Hornets were accompanied by a KC-10 tanker aircraft that provided air-to-air refueling. En route to Malaysia, the crew made stopovers in Hawaii and Guam. The eight Hornets fulfilled strike and interdiction missions as part of the RMAF modernization program. Initially, the aircraft were used to train RMAF pilots. Boeing provided a logistical package that supported aircraft operations at the RMAF base at Butterworth. The RMAF Hornets were equipped with the upgraded Hughes APG-73 radar and two General Electric F404-GE-402 enhanced performance engines. Malaysia was the first nation in Southeast Asia to purchase and receive the F/A-18.

Finland acquired F-18s after an extensive multi-country evaluation that included the F-16, Mirage 2000, SAAB Gripen, and Mig-29 and 31 Russian fighters. Letters of offer and acceptance were issued on 5 June 1992. Finland used F-18 C/D Hornets with specific Finnish mid-life update. The Finnish Hornets lacked certain avionics and target acquisition and weapon control features, which limited their ground attack capability. The 7 F-/A-18Ds were built by MDD, but Finland-based Patria assembled the 57 single-seated F-18C model units.

Switzerland's acquisition of the Hornet was similarly tortured. The Kommando der Flieger began looking for a replacement for their Mirage III and F-5 fighters in the mid-80s. Initial competitors included the F-16 and Mirage 2000. Later in, the Israel Aircraft Industries (IAI) Lavi, Northrop F-20, and SAAB Gripen were also competitors. The Kommando der Flieger selected the Hornet in October 1988. Orders for 34 F/A-18s were placed, but politics intervened when French President François Mitterand made a personal appeal to the Swiss government to reconsider its decision. Ultimately, a plebiscite was required to ensure that deliveries would commence before 2000. The first Swiss Hornet rolled out of the factory on 25 January 1996.

The most visible difference between a CF-18 and an F/A-18 is the 600,000 candela night identification light. Visual identification of night intruders is apparently an important mission requirement for the RCAF. This spotlight is mounted in the gun loading door on the port side of the aircraft. Some CF-18s, whose mission does not include air defense, have the light temporarily removed, but the window is always in place. The underside of the CF-18 features a painted "dummy canopy," which might create the impression of a turn into an adversary when the Hornet is actually turning away. (John Gourley)

A Spanish EF-18B celebrates 100,000 flight hours with special markings. During Operation Allied Force, Spain provided EF-18s from L'Ala de Caza 12. (Colin Norwood)



(Above) The Hornet replaced the Mirage III in RAAF service beginning in 1985. The initial order was for 57 A models and 18 B models. (RAAF)

A formation of four Kuwaiti Air Force Hornets, with their distinctive camouflage markings, perform a breakup maneuver. (Peter Steinemann)

(Below) Before the Iraqi invasion of August 1990, the Kuwait Air Force ordered 32 F/A-18C and F/A-18D Hornets to replace their A-4KU Skyhawks. Delivery of these Hornets began on 8 October 1991 after Operation Desert Storm. (Peter Steinemann)

The first of 8 F/A-18 Hornets for Malaysia, a two-seat F/A-18D, was delivered in 1997. (Peter Steinemann)

(Bottom Left) A Swiss Hornet taxis on a Swiss takiway. The Swiss Fliegerstaffel 11, 17, and 18 operate the F/A-18C/D Hornets with the upgraded APG-73 radar. During the seven day World Economic Forum in 2003, Swiss F/A-18's flew CAP over Davos with two armed F/A-18's during the day. At night two F/A-18's were on ready alert. They were armed with two AIM-9 and two AIM-120 AMRAAMs. (Andre Jans)

(Top) A Hornet belonging to theThe Kommando der Flieger-und Fliegerabwehrtruppen (Swiss Air Force and Anti-Aircraft Command) takes off from a Swiss Air Place. The Swiss Air Force replaced their Mirage IIIS with F/A-18s beginning in 1996. After the initial two U.S. Hornets were delivered, subsequent F/A-18s were built in Switzerland. (Andre Jans)

(Bottom Right) A Hornet from the Finnish Air Force takes off from the McDonnell St. Louis plant at Lambert Field. The first F-18 Hornet for the Finnish Air Force was delivered on 7 June 1995. The Suomen Ilmanvoimat replaced their SAAB Drakkens and Mig-21s with F/A-18C/Ds. (Boeing)

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